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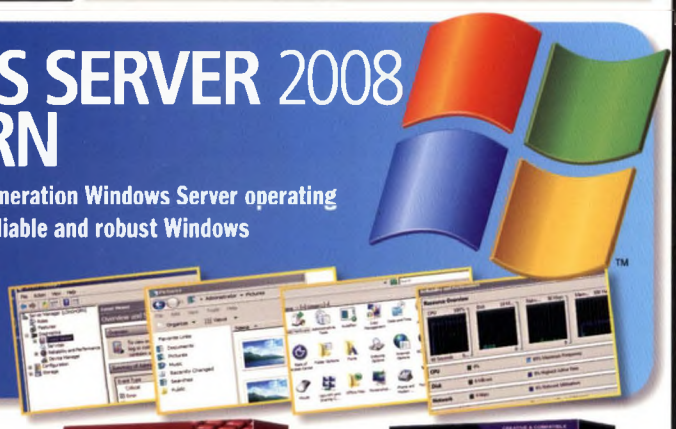

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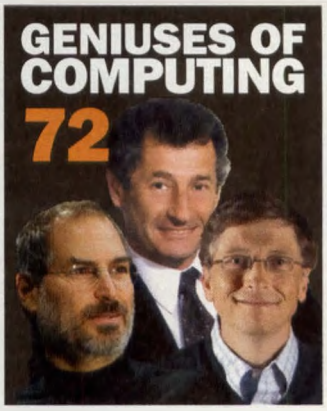

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This logo indicates a free, complete and unrestricted software package, available only on *APC*'s cover DVD.

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apc editorial

TONY SARNO

As someone who's regularly called to help friends with computer problems, I often find traces of porn visits on their PCs — traces which almost always extend beyond the browser history, which they clean with great regularity. I would say that in 90 per cent of the PCs I have to fix on a social basis, even those of upstanding members of society (men and women), I have noticed the telltale signs of visits to X-rated sites. It amuses me privately no end, particularly when many of these people get really moralistic about the bad behaviour of others. Basically, as far as I can tell, virtually every adult sneaks a peak every now and then, so it's the norm, and I'm surprised if I *don't* find traces left by porn sites on someone's home PC.

But I get upset when my daughter is searching for images for a school project and, in the third page of Google Search results, she suddenly starts giggling and I find she's looking at a picture of a man with a ring in his penis. Apart from the difficulty of having to explain to a 10-year-old why anyone would do such a thing, at the time I was annoyed that the internet industry keeps turning a blind eye to the issue. When Senator Coonan announced the porn filter, the very predictable snickering stories of schoolboys showing how to bypass the filter were shown in the media. The prevailing view of the Coonan porn filter announcement was that preventing porn from appearing to children was just too hard.

It really seemed like a mass abdication of responsibility to me. And then I realised I had to include myself in that. I had not ensured she'd never come across that kind of image. There was filtering software I could have installed on her PC. It was a Vista machine, so it had parental controls, but I hadn't set them. In fact, I was doing the same as many others, assuming that protecting my daughter was someone else's job — such as the internet industry or the government.

I was part of the problem. Hopefully, with new filtering software and parental controls on my machines at home, I can now go some way to protecting my children. Now, if the ISPs — who it seems are unwilling to consider any filter unless it's imposed by legislation — were also willing to provide an option for a filtered feed, we'd get a little bit further in the battle. And if the porn industry was able to accept even the slightest responsibility for ensuring their product is consumed by people of appropriate age, then we might make some more progress. It just takes a willingness to put the social benefit ahead of profits. We're starting to do that with the environment, why not with porn?

tsarno@acpmagazines.com.au

> I WAS DOING THE SAME: ASSUMING THAT IT WAS SOMEONE ELSE'S JOB, SUCH AS THE NET INDUSTRY OR THE GOVERNMENT

OCTOBER AWARDS

We reserve the Editor's Choice award for the very best products available on the market.

***APC*'s Highly Recommended award is bestowed upon products that are of great overall quality.**

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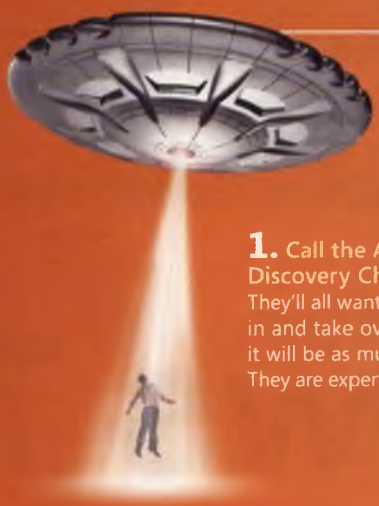
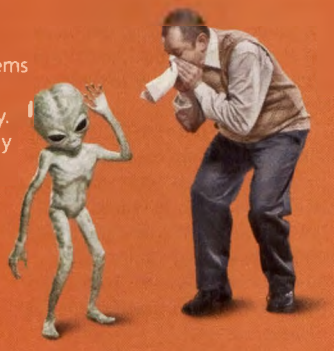
taking on an alien invasion. easy.



1. Call the Army, the Navy, and the Discovery Channel.
They'll all want to know. They may swoop in and take over the situation, but then it will be as much their problem as yours. They are experts and maybe they can help.

2. Steal the keys to their spaceship.
It sounds desperate but it just might work. When they realise they're stuck here they may mellow out and try to work it out instead.

3. Sneeze on them.
Aliens have different immune systems from our own. Which means even the common cold could be deadly. Cough in their direction, and spray when you talk — even if they are immune they'll be grossed out enough to leave anyway.



4. Try negotiating. (Or not.)
They may not come in peace, but they are advanced. Pitch them like a client; explain why humanity should be spared in under 50 Microsoft® PowerPoint® slides, then close the deal. Or just grab their feet and spin them around.

5. Play dumb, then run.
The Aliens may not know who's in charge. Tell them squirrels rule the Earth, and that we're their slaves. When they start trying to negotiate with the squirrels, run and hide.

taking on hackers. easier.

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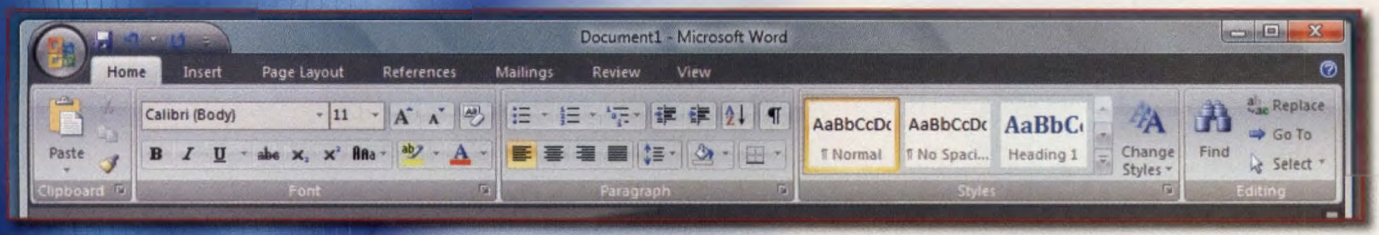
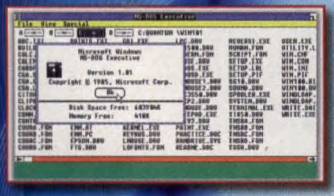
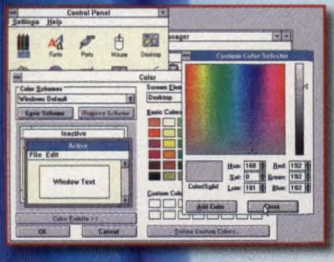
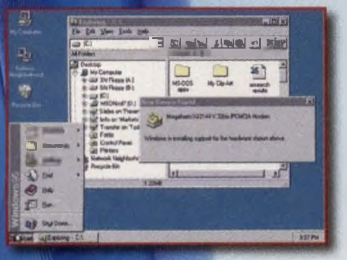


New UI for 'Windows 7'

The next version of Windows, due in 2010, will have a UI inspired by Office 2007.







The post-Vista edition of Windows doesn't yet have a name, but it's got a date (2010), and it's getting a fresh look. Following a presentation at Microsoft's annual Global Exchange sales conference in Orlando, a Microsoft spokesperson said to the media that "Microsoft is scoping Windows '7' development to a three-year timeframe, and then the specific release date will ultimately be determined by meeting the quality bar."

If you're wondering what happened to the codenames of Vienna and, before that, Blackcomb, which were originally attached to the OS, Windows senior VP Steven Sinofsky has banished those ciphers as a sign of his desire to refocus the team on the features rather than the hype.

It's in keeping with Sinofsky's previous reign over Office 2000, XP/2002, 2003 and 2007 — all of which were known only by their internal version numbers (such as Office 2007 being 'Office 12') before being christened with a marketing label.

The next edition of Windows will technically be the seventh generation of the Windows NT codebase, which is now the foundation for the client OS (the clock starts at Windows NT 3.1; this was followed by NT 4, while Windows 2000 was also 'Windows NT 5' and XP a mere 5.1, until Vista clicked the meter over to Windows version 6).

And as he did with Office 2007, Sinofsky has declared that all bets are off when it comes to the UI of Windows 7. He's hired Julie Larson-Green, who lead the Office 2007 user interface team under Sinofsky's watch, as VP in charge of the "the Windows User Experience" or UX program.

Larson-Green was pivotal in the dramatic redesign of Office 2007, which ditched the long-established model of menus and toolbars — which had grown cluttered and out of control over two decades of development — for that single integrated and context-morphing 'ribbon'. Few could argue that Windows isn't in need of a similar cleanup job — the iconic overload of Vista's Control Panel is a prime example of a once-friendly UI turned feral.

Jensen Harris, who was program manager for the Office 2007 UX team and now fills Larsen-Green's role in fine-tuning the face of Office 14 (not wishing to tempt fate, they're skipping 13) recalls that it was Sinofsky who drove the suite's radical 'interfacelift'.

"It originated with Steven Sinofsky," Harris told *APC* in a recent interview. "Steven had certainly noticed, like we all had, the growing interface clutter around the core Office apps, and he thought we should put a set of people together and at least think about this. Larsen-Green was also a staunch advocate for rethinking the way Office worked and, more importantly, the way users wanted it to work," says Harris. "She recruited me to do something bold to change the UI of Office. Julie was really serious about trying to understand the problems with the UI."

Of her new role in the Windows team, Harris observes: "Julie is definitely a champion of building great user experiences, and I know that in Windows she'll be looking to do the same types of things that she did in Office, which espouse great design values. Whether or not that means we'll see such a radical overhaul of the UI in Windows 7, I think it's too early to say".

Two things are certain: Sinofsky is a serious agent of change for the Windows OS, and Larsen-Green hasn't been brought into the UX team to keep things the way they are.

David Flynn

LONGHORN to launch in Feb 2008

With Windows Server 2008 now in beta 3, the launch of the replacement for Windows Server 2003 is only months away. *APC* spoke to Microsoft's head of Server and Tools, Martin Gregory.

APC: We're carrying beta 3 of Longhorn on our cover disc. What are some of the key improvements in Windows Server 2008 compared to the current server OS 2003?

MARTIN GREGORY: Our design guide, as we built Windows Server 2008, was to deliver a result that was more secure and provided increased management and better reliability. Our development team looked at all of the different workloads to ensure it could manage each scenario. But, regardless of what workload the server is assigned to, it needs to cover the fundamentals, well. A few of the key improvements I see include Network Access Protection, or NAP. This helps corporate network deployments by delivering support for machine quarantine and system access based on system health in a variety of scenarios. These scenarios include Branch Office, which is a major change in the way branch offices are managed, secured and maintained.

Active Directory now provides for granular replication of account information to a branch office server rather than all the accounts that may never visit that environment. This helps with security and efficiency. BitLocker is a security feature that helps protect servers, workstations and mobile computers by encrypting the contents of a disk drive, thereby mitigating business risk especially in physically unsecured environments. Distributed File System Replication (DFS-R) provides for efficient data replication for backup and file distribution purposes and only changes the blocks on the disk that have changed, not entire files that may change as edited. This ensures WAN links are efficiently utilised.

Another key improvement is IIS 7.0 – this is the new built-in Web Server, which adds componentisation and support for FastCGI with PHP. Then there's the new Terminal Services, which provides single application publishing and gateway services for secure application access, and Virtualisation.

APC: Microsoft's David Lowe, from the Windows Server division told apcmag.com that Microsoft was working hard to improve some of the fundamentals of Windows Server that have been annoying system admins. What are some of the fixes that Server 2008 brings in response to comments from users?

MG: A lot of the improvements that respond to users' feedback are around configuration, system deployment and overall administration. Some of these include upgrades to Server Manager – this provides a single, unified console for managing a server's configuration and system information, displaying server status, identifying problems with server role configuration, and managing roles installed on the server.

There are also upgrades to the PowerShell: a command-line shell and scripting language that helps IT pros automate system administration of basic server management tasks as well as specific server roles, such as Active Directory, Terminal Server and Internet Information Server (IIS) 7.0. The new Windows Deployment Services provides a better way to rapidly and remotely deploy Windows operating systems. With the upgrades to the server core, Windows Server 2008, administrators can choose a minimal installation of Windows Server with specific functionality and without any unneeded features. With the Server Core installation option in Windows Server 2008, administrators can reduce the ongoing maintenance requirements for servers and simplify their management.

APC: What are some key examples of Server 2008's integration with the Vista OS that do not exist between Windows Server 2003 and XP?

MG: A lot of the new integration changes have focused on making Windows Vista and Windows Server 2008 integration more efficient; for example, support for more efficient Server Message Block (SMB) communications that reduces network traffic and TCP/IP functions such as Receive Side Scaling allows variable receive window sizes depending on network latency. This makes the combination of Windows Vista and Windows Server 2008 much more efficient and faster on the wire, especially in latent WAN scenarios.

APC: There are several versions of Server 2008. Why?

MG: Our Windows Server 2008 family comes in several editions including Standard, Enterprise, Datacenter, Web and Itanium. This gives IT pros increased flexibility for their server infrastructure while giving developers a stronger web and applications platform.

APC: Where does the next version of Windows Small Business server fit into the scheme of things?

MG: Our next version of Small Business Server will be built on Windows Server 2008's code base and will support the newer server apps like Exchange Server 2007. We see the next version of SBS as an exciting release for small business and think that the innovations provided in Server 2008 plus the newer server applications will deliver the big business functionality at the small business price.

APC: When will Windows Server 2008 be officially released in Australia?

MG: We'll launch Windows Server 2008 in Australia on 27 February 2008.

Microsoft's head of Server and Tools, Martin Gregory.

Farewell FireWire?

Apple's interface standard is relegated to 'niche' status.

A recent study by In-Stat has revealed that IEEE 1394 use is heading for a slow decline. The report, *1394 2007: A Niche Interface*, says that the serial bus interface standard has got a couple more years left in it, with the rot setting in around 2009, having reached its expected peak in 2008.

Apple completed co-development of the interface in 1995 with help from Texas Instruments and Sony, among others, and it's related to the reliable, child-proof connectors on the old Nintendo GameBoy. Cracks, though, have started to show in the market penetration, if not the connectors themselves.

"1394 suffers from being the second choice technology in many product segments," says In-Stat analyst Brian O'Rourke. "For example, 1394's historic one-third penetration of the PC market is now dwarfed by high-speed USB's 100 per cent penetration." Even FireWire's biggest supporter, the digital camcorder market, is set to drop off with USB 2.0 picking up the slack. According to the report, 1394's penetration of this market fell from 85 per cent to 77 per cent between 2005 and 2006. Indeed, signs were pretty bad when Apple itself ditched FireWire on its iPod in favour of the USB.

In other sectors it's being replaced by HDMI. DVD players, set-top boxes and digital TV are all looking to embrace this newer interface that's compatible with the all important HDCP DRM technology for hi-def content.

Laser tech may revive HDDs

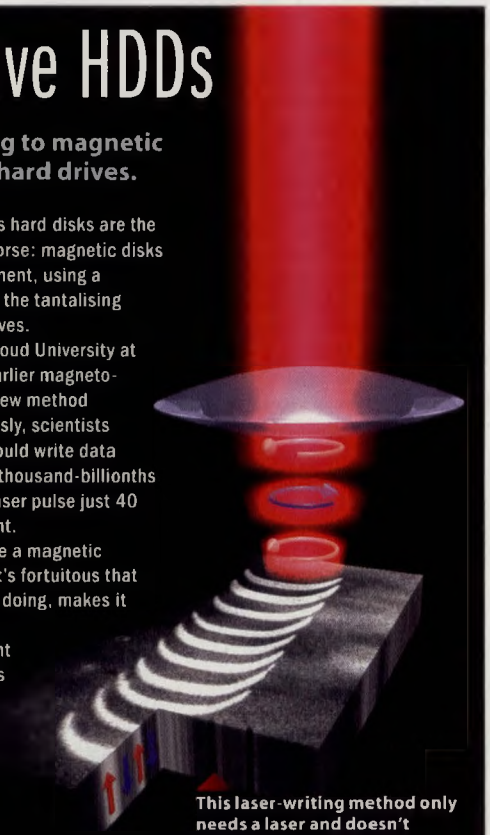
Dutch scientists demonstrate laser writing to magnetic media at 100 times the speed of the best hard drives.

Speeds of up to 100MB/s might sound fast but today's hard disks are the weakest link in any PC. And things are only getting worse: magnetic disks are only improving at 20 per cent a year. But a new development, using a technique that was previously thought impossible, holds out the tantalising promise of disks 100 times faster than today's best hard drives.

The breakthrough, by a team of Dutch scientists at Radboud University at Nijmegen, uses a laser to write to a magnetic disk. Where earlier magneto-optical disks also required an external magnetic field, this new method uses only a laser beam, and with impressive results. Previously, scientists had shown that the shortest, reliable magnetic pulse that would write data to a disk was in the region of two pico seconds – that's two thousand-billionths of a second (2 x 10-12). In the Radboud demonstration, a laser pulse just 40 femto seconds long was used – that's a 50-fold improvement.

A very short yet powerful pulse of laser light can generate a magnetic field, but it would be far too weak to write data reliably. So it's fortuitous that the laser beam also heats up the magnetic media and, in so doing, makes it ultra-sensitive to tiny magnetic fields.

Rarely can a new technology go into development straight away, and this one is no exception – first a couple of hurdles have to be cleared. Obstacle number one is that individual laser-written bits are five microns across. This is huge compared to today's disks, and would result in a very low-capacity disk. Second, lasers capable of generating pulses shorter than 100 femto seconds are currently very expensive. In time, scientists believe they'll be able to address both these issues but don't expect to see laser hard disks much before 2017.



This laser-writing method only needs a laser and doesn't require the usual external magnetic field.

THE (A)PC REVOLUTION

October 1985

LAP PORTABLES

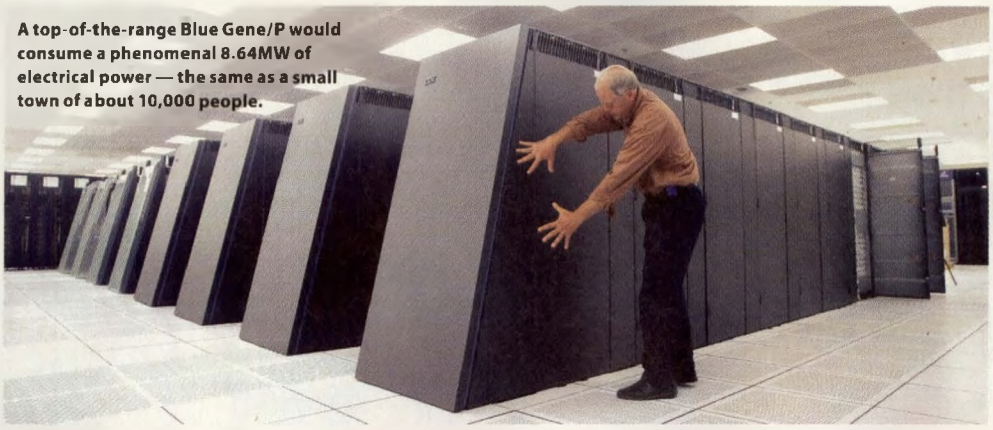
In 1985, there was no such thing as a laptop, let alone a notebook. The first laptop-like machines were known as "lap portables", and none were as exciting as the Data General/One. The premium version weighed "four kilos, has two internal 3.5in disk drives and an 80 x 25 character LCD screen." The basic system, as described by *APC*, consisted of "computer with 256KB RAM, one 3.5in disk drive and absolutely no other internal or external components." And it cost $4,995!

THE HOT MICRO

Sending *APC* into raptures in October 1985 was the new Amstrad CPC6128. *APC* wrote: "A micro with 128KB of RAM, a monochrome monitor, built-in disk drive, CP/M3, DR Logo and priced at $800 sounds like a formidable entry into the marketplace."

ULTRA-FAST MODEMS

"Ordinary telephone lines will soon be able to carry twice or four times the computer data they now can, says a tiny American startup. Telebyte Technology Inc., in Greenlawn, NY, is demonstrating a modem that transmits error-free data at 4,800 baud, and company president Joel A. Kramer boasts that the rate will soon rise to 9,600 baud."



A top-of-the-range Blue Gene/P would consume a phenomenal 8.64MW of electrical power — the same as a small town of about 10,000 people.

WORLD'S FIRST Petaflop computer

100,000 times faster than the average desktop PC. But what can the Blue Gene/P do?

The Blue Gene/P range of supercomputers from IBM are the first computers with the potential to exceed one petaflop. That's a quadrillion (1,000 trillion or 1,000,000 billion) floating point operations per second. But what practical applications will we see and what could possibly knock Blue Gene/P off its pedestal as the world's fastest computer?

A petaflop computer is about 100,000 times faster than an average desktop PC. It's also equal to the combined power of a stack of laptops almost two and a half kilometres tall. All this is hardly surprising, given that Blue Gene/P can be configured to use thousands of processors, 884,736 of them to be precise, connected together using a special high-speed optical network. It will help solve scientific problems, including predicting climate change and understanding complex biological systems.

In this top-of-the-range configuration, Blue Gene/P will occupy 216 racks, each two metres tall. When fully configured, the Blue Gene/P will clock in at three petaflops, almost ten times the speed of the current number one supercomputer, an IBM Blue Gene/L at California's Lawrence Livermore National Laboratory.

OPTICAL CONNECTS

IBM's use of an optical network to connect together the nodes in its Blue Gene/P is evidence that copper cables just couldn't cut the mustard. This is an advantage that Intel is exploiting in its new class of optical cables which it expects to benefit the world of high-power computing. The new cables will allow data transmission at 40Gbit/s, will be 83 per cent smaller and 84 per cent lighter than copper and will allow communication over 100m compared to 10m at present. This in turn will allow much larger clusters to be built, using nodes across multiple floors of a building.

Intuitively, supercomputers don't seem to be as power-hungry as heavy electrical machinery, but it can add up. Each cabinet has a maximum power consumption of 40kW, so a top-of-the-range Blue Gene/P would consume a phenomenal 8.64MW of electrical power — about the same as a small town of 10,000 people.

Surprisingly, therefore, IBM promote Blue Gene/P as frugal, pointing out that it's seven times more energy-efficient (in terms of operations per watt) than any other supercomputer. These 'green' credentials result from the use of low-power four-core 850MHz PowerPC processors (compared to Blue Gene/L's 700MHz dual-core chips) and sophisticated power management.

IBM machines now hold four of the top seven places in the top 500 list of the world's fastest computers. So it might seem like the supercomputer wars are almost over. But a recent product announcement suggests that Sun Microsystems doesn't intend to let Big Blue dominate the market. Sun's solution is called Constellation, and the specification is impressive.

The architecture supports three different processor families: Sun's UltraSPARC T1, AMD's Opteron and Intel's Xeon. When fully configured, Constellation will achieve almost two petaflops, just a touch behind the Blue Gene/P's headline figure.

Computer scientists now have their sights set on the next big milestone, 10 petaflops, and it may only be a couple of years away. It's been reported that the Japanese government research institute Riken has signed a $948 million contract with Hitachi, NEC and Fujitsu to develop a 10-petaflop supercomputer by March 2009.

APC AND FEDORA?

A reader, Ross McLeod, has nominated us for Dumbest Moments, pointing out that we wrote about the installation problems with the latest version of Fedora in *APC* August's Dumbest Moments, then promptly supplied Fedora 7 on our DVD for September. McLeod also experienced installation problems, just like our reviewer, Ashton Mills.

Ross, you probably have a point there, but we did try to repeat the problem Ashton had with the full Fedora install on several of our test machines in the *APC* offices (and couldn't). It installed perfectly, hence our decision to make it available as a DVD ISO on our disc. We didn't test the Live CD, since that was not included on our DVD disc.

What's annoying about Fedora's installation issue is that in one form or another, we've been writing about them as long as we can remember, and they *still* haven't been sorted. As far as we can tell, many have their origin in an overzealous (or buggy) media checker which looks for the proper install media — but is waylaid when the media is played in certain drives.

If you've had problems with installing Fedora and have some answers as to why this is happening, send us an email at acpmagazinefeedback@acpmagazines.com.au.

Want to nominate a dumbest moment in tech? Send an email with the subject line "Dumbest Moments" to dwarne@acpmagazines.com.au. All correspondence becomes the property of *APC*.

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Movement to control PCs

Forget buttons — soon you'll be using hand gestures for device control.

The growing trend towards smaller electronic devices means keyboards, mice and even buttons may soon be obsolete. Instead, we'll be controlling devices using hand movements alone, say leading technologists.

The possibility was highlighted recently by the Georgia Institute of Technology. The thinktank showed off a watch which could control an ear-bud sized MP3 player. The player's small size meant normal buttons and sliders wouldn't be feasible, so instead the watch interpreted the user's hand signals and sent instructions, via Bluetooth, to the MP3 player.

The Gesture Watch consists of five infra-red sensors, four of which are aimed above the watch face and are capable of tracking hand movements. The fifth sensor gathers the motion data and transmits it via Bluetooth. The innovative design allows the user to fix the position of the watch in space, allowing better distinction between input commands.

Gesture control isn't just confined to the lab. Logitech has launched the MX Air Cordless Air Mouse. It's a normal laser mouse when on a desk, but when lifted up it controls a PC with just a flick of the wrist. It's intended to make controlling media centres easier.

Vast strides are being made in gesture control technology thanks to improvements in camera-based recognition. Better image processing means that cheaper cameras using sophisticated algorithms have replaced the high-end cameras and ludicrous brightly coloured gloves of the past, making them better suited for use in devices like remote controls and mobile phones.

Charles Cohen, vice president of Cybernet Systems Corporation and an expert in gesture recognition, warned not to expect too much from the technology yet: "Consumers expect robustness. When you press a button on your television remote control, it works every time. Gesture recognition sensing technology is inherently less robust, and if it is pushed to market too soon, consumers may feel the quality is [uninspiring]."

He does remain optimistic about future widespread implementation; he envisions "cheap cameras the size of a thumbnail available everywhere, recognising motions, gestures, and behaviours, and being used for entertainment, appliance control and security."

The phenomenal success of Nintendo's Wii has transformed gesture control from a technical curio into the next big thing.

AMD's VISION FOR THE CPU

John Brandon quizzes AMD's chief technology officer and senior vice president, Phil Hester, about the move to better CPU and GPU interoperability.

In 1994, the computer industry had reached a major choke point. Some wondered openly if the computer could advance further, whether anyone really needed more processing speed and if the PC had reached a point of critical mass for business users. This was also the year that PC gaming started embracing 3D graphics cards and when Intel pushed forward with multimedia chipsets that could handle photos, video and CD-ROM data.

Flash forward 13 years and the industry has reached another milestone. 3D graphics have evolved well beyond gaming and have now entered the corporate world. Windows Vista demands a high-end graphics card for the best experience, and we routinely archive thousands of photos, video files and documents. No wonder AMD, and specifically Phil Hester, the CTO, are pushing forward a new age of CPU and GPU convergence. In this interview, he spells out the technology roadmap for that dramatic PC processing shift.

APC: What would you say to a power user about why they should choose AMD, as opposed to Intel, for a system they are building?

Phil Hester: Today, it is the performance we deliver for a given investment — not just the CPU level but the system level. For example, we continue to believe that, with DDR memory technology, it is a much more cost-effective solution for memory technology. We believe that by integrating the memory controller on chip, you get significant memory performance and scalability that you don't get with a frontside bus. And then, in particular, as you look at the second generation of fusion of CPUs into APUs and being able to exploit the parallel performance of the GPU for more applications, this will make a big difference.

One of the huge bottlenecks for enthusiast applications is rendering HD video. The performance you get out of a modest GPU is in excess of a 16- or 32-core x86 engine. This whole 'core wars' thought is as misdirected as the megahertz wars were. What you'll see us provide is heterogeneous processors that really focus on a whole wide range of applications that enthusiasts can take advantage of.

AMD has a solution that is basically two dual-cores; what we have coming is a native quad-core. We didn't take two dual-cores and stuff them together — that's what Intel did. We implemented a native quad-core design with what we think is the right memory hierarchy, thermal envelope and compatibility at the system level. Our customers wanted scalability, staying within the thermal envelope, and price performance. Core for the core's sake to us has no purpose. It is really what value you deliver at the system level. Our customers told us they wanted a quad-core that fits within the socket we have today, with the same thermal envelope and field upgradability available.

APC: Processor development seems to be increasingly limited by

PROFILE

Phil Hester has held the position of senior vice president and chief technology officer (CTO) at AMD for about a year. He has worked in the technology sector for 28 years, running a start-up technology company for five years and, prior to that, was at IBM for 23 years. His last position at IBM was the CTO for the PC-based division for systems running Microsoft and Linux consumer products.

Phil Hester says AMD's new fabrication plants are to cope with the demand of wafers and transistors, which can then be supplied at a lower cost.

the technology used in its fabrication. We know immersion lithography and ultra-low-K interconnect dielectrics can change the performance and power landscape for processors in the next few years. How will they help push the technology envelope?

PH: In general, if you get into the deep sub-micron technologies, a lot of the linear scaling factors that you saw in the past, relative to transistor performance, will no longer scale. A lot of this has to do with the fundamental limitations of physics, of leakage current, and approaching some of the fundamental limits of the wavelength of photo-lithography equipment. With immersion lithography, because the transmission coefficient in water is better than what is in the air, it allows you to continue to some of the more standard technologies that were developed in the 90 nanometer and earlier timeframe than what they are in the 65nm timeframe and beyond. It's a way to provide photo-lithographic scaling, without having to use double-exposure techniques and things like that.

> WE BELIEVE, IN THIS 3D AND VISTA WORLD, THAT THERE IS A WHOLE NEW CATEGORY OF PROCESSORS THAT NEED TO BE CREATED

APC: What was the broad purpose behind the ATI acquisition?

PH: If you look at what is happening in the PC space, we have gone from a PC that is predominantly processing just integer and floating point data to one that is processing multimedia and 3D data streams. If you look at a PC today, and you look at the graphics subsystem, graphics are equally important, if not more important today than the x86 processor for general-purpose instruction processing.

Many applications today are 3D, almost all of the games are now 3D, particularly if you look at the introduction of Vista. Now in the client space, every single client PC is going to have to have 3D graphics as a starting point for any functional PC. PC architecture has also evolved, it actually was a robust platform, with an architecture that was created in the early 1980s where all you were doing was word processing, to something that is now a high-performance multimedia platform. As it has evolved, if you look at how the CPU and GPU communicate with each other, they are starting to be impacted by how the legacy pieces were necessary in the evolution. For example, today the way the CPU talks to the GPU is usually through an external bus and

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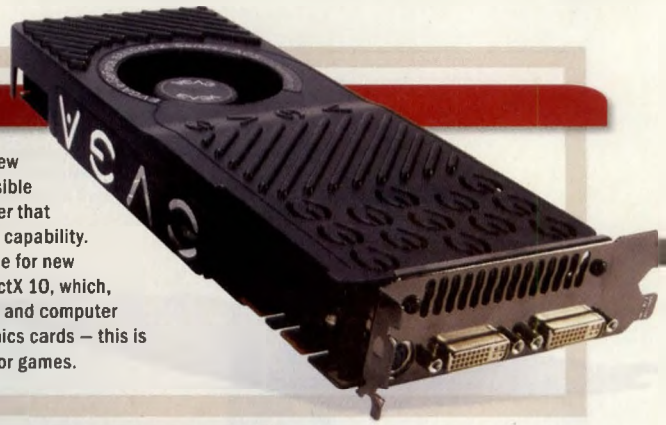
CONSUMER GRAPHICS

The consumer graphics market has seen a massive explosion over the last couple of years, partly due to the public's increased appetite and interest in gaming (fuelled in part by the introduction of the Xbox 360 and PlayStation 3), but also as a result of new applications and operating systems that use 3D graphics, such as Microsoft Office 2007. Pricing for 3D graphics cards, especially those that are meant for normal everyday use on a mid-range computer, has now fallen steadily from the high-point price of a few years ago. And, it's now impossible to buy a new notebook computer that doesn't come with 3D graphics capability. What may change the landscape for new graphics cards, though, is DirectX 10, which, once again, ups the price point and computer dependence on high-end graphics cards – this is mostly seen when being used for games.



a PCI connector, and there is a lot of overhead associated with moving information back and forth.

The GPU is starting to become a much more general computing component, as opposed to something that only deals with graphics. Because it was created as a specialised processing unit, it wasn't really thought about as a general computing resource.

As 3D processing and multimedia become the standard of just about any application, you want a lot more thought going into that 3D and multimedia data stream, and as well-thought as a general-purpose x86 instruction set. Having those two entities separated from each other makes that extremely difficult.

By putting the CPU and GPU together on the same chip, you can solve a lot of the efficiency elements because the data now stays on the chip and not off-chip. It allows you to take advantage of the hierarchy of the caching structures that are in the CPU, and to custom-design power management techniques and performance for both GPU and CPU.

We believe, in this 3D and Microsoft Vista world, that there is a whole new category of processors that need to be created, what we refer to as accelerated-processing units, or APUs. They combine on one chip both the general-purpose x86 processing with graphics that will be generalised more and more over time. The GPU is now a very capable parallel processing element.

AMD's transistor size is going to decrease from 65nm to 32nm, and Hester says they will be "more optimised and improved".

APC: Do you think that high-end graphics cards will ever come down from their current price?

PH: There are really three levels. There is an entry level, an enthusiast level and the premium level. I don't see those levels going away, each has had a stable price band, but you do get more performance and function. Each generation has higher performance, but what you get for the same amount of money has not changed. In terms of graphics that are more efficient, the benchmarks are changing.

The Windows Vista requirements for a base-level PC are higher than what could run XP. The OEM picks price points for consumers and tries to put as much functionality into that price point as possible.

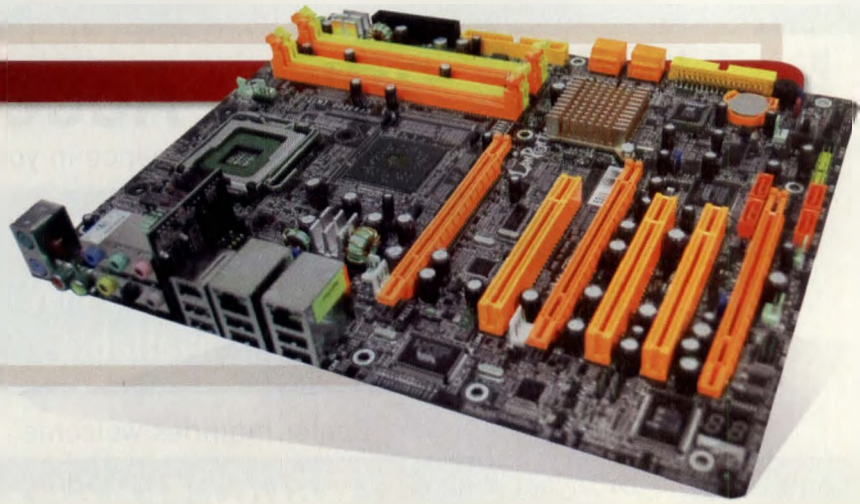
APC: Do you think Intel and Nvidia were surprised by the ATI acquisition, and do you think they are nervous about it?

PH: I think Intel was thoroughly surprised by what was going on. Nvidia is a partner of ours, it continues to be a partner, and we are not trying to block it out. Likewise, we continue to see discreet ATI graphics cards plug into the industry standard bus like PCI Express on an Intel motherboard just as well as they do on AMD. We are in the graphics business from a graphics side of things, and we are also an open-platform choice, so if someone wants an Nvidia adaptor, we will provide that capability. We are not in the Intel school of thought that says we are going to tell you every single chipset vendor that you have to have in order to qualify for a sticker. We think that is a fundamental mistake.

While AMD seems in a prime position to move PC technology into its next stage of development, with the ATI acquisition adding some obvious credibility to its plans, it's still unclear how the market will react. In fact, it's still too early to know if Microsoft Vista (and the related graphical advancements) will be a hit with consumers. APC

THE INTEL REACTION

It's difficult to know how Intel can react to the ATI acquisition, especially given the fact that it depends on the graphics cards companies for interoperability with motherboards and processors, and given the fact that PC makers such as Gateway or Dell are impartial to the fact that one company may provide a CPU and GPU for performance systems. For them, if the price is right and the performance is high, the link between CPU and GPU may become a selling point, rather than having to work with Intel



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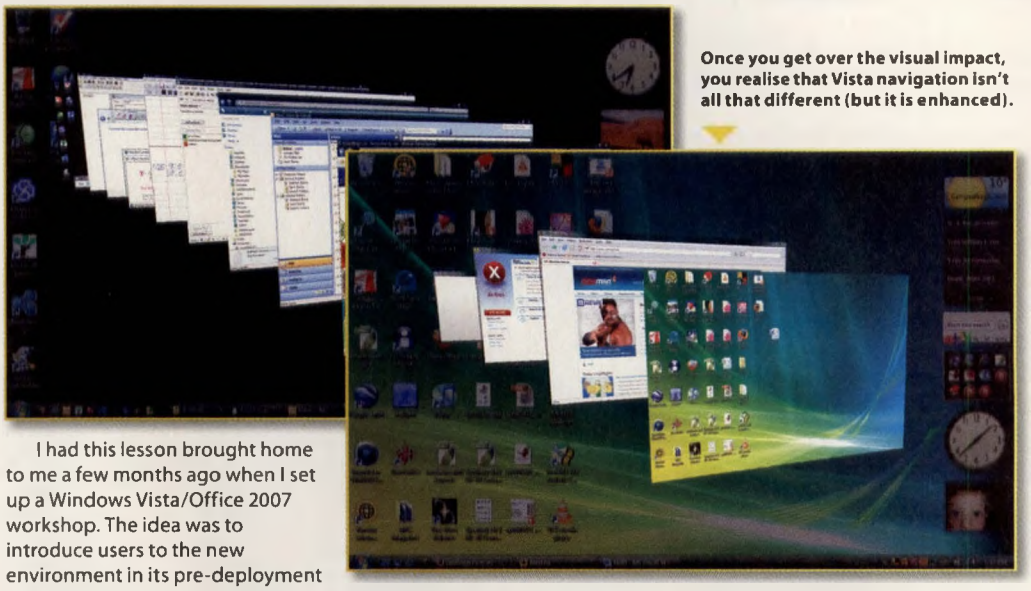
Give Vista a chance

Vista's UI takes some adjusting to after years of Windows XP, but it's well worth the effort.

In the early days of beta testing Windows Vista, I often wrote about how the changes in the user interface were likely to cause frustration and loss of productivity for no real apparent benefit. Well, having used Vista every day since March for all my work, I should admit that I might have been wrong.

Of course, adjusting to any new UI takes time, especially when you're used to doing the same tasks using the same methods for years on end. Adopting new methods and accommodating new technologies is a gradual process, and when you're using the new systems well, you don't tend to notice it.



Once you get over the visual impact, you realise that Vista navigation isn't all that different (but it is enhanced).

MY VISTA SURPRISE

It's one of the ironies of IT that you're only really aware of something when it doesn't work well or has stopped working altogether, and assessing the merits of a particular product tends to be done in an atmosphere relative to contemporary products, rather than in an isolated bubble of non-bias. A product is good if it's good compared with the alternatives, rather than simply good in its own right, and once you've got the hang of a new system you no longer tend to think about it nor compare it with how you used to do things.

I had this lesson brought home to me a few months ago when I set up a Windows Vista/Office 2007 workshop. The idea was to introduce users to the new environment in its pre-deployment stage, and my main focus was to demonstrate all the new features which I'd anticipated would be of most concern, mainly the new UI and Windows Explorer.

I was fully anticipating resistance and pessimism from the people who attended the workshop, based on the general assumption that change is bad and doing things differently is just painful. But, without exception, everyone was engaged and interested, and ended up telling me how much they were looking forward to Vista and Office 2007 being deployed.

I was fairly staggered. I suppose it always helps being introduced to a new technology in a low-stress environment where there's no immediate impact on the user. Businesses might want to consider this approach when planning their own deployments.

MAKING THE SWITCH

So what got people excited about the Vista UI? Mostly it was having the opportunity to realise that the most obvious visual changes — particularly Aero Glass — are not that important from the perspective of day-to-day computing, and therefore nothing to be concerned about.

Once you get over Vista's visual impact, you quickly realise that all the old methods of Windows navigation are still present and correct, it's just that they've been enhanced. Personally, I turn the old Explorer menus back on straight away, yet I find I'm using them less and less. The address bar which now displays your location in the file system by means of segmented blocks is fantastic for navigating quickly from one point to another.

In fact, the deeper you go into the system the more useful it is. And yet, click into the bar and the old location naming system is instantly restored. Go to rename a file and Vista automatically excludes the file extension from the selection — it's such a simple adjustment but it makes life that much easier.

So it seems that there's less cause to be apprehensive in presenting Vista to users, but much of that depends on how you present it. Force it down their throats and your deployment will be a nightmare. Get them excited about it and you won't be able to roll it out fast enough.

HastalaVista

by James Bannan

James Bannan is a systems manager at St Leonard's College (Vic) and APC's resident Windows expert. He'll be checking out Vista for you every month.

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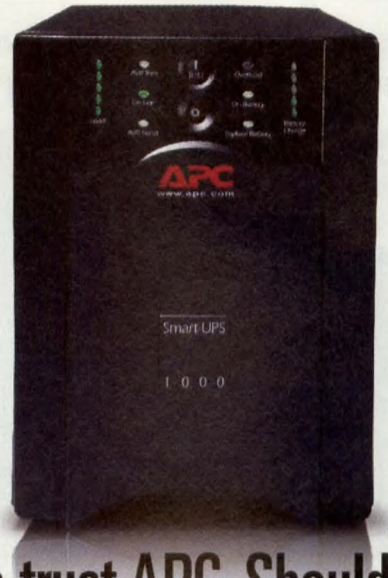

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The status quo

Linus Torvalds has the foresight and experience to know what open source is truly capable of — but his views aren't always going to be popular.

The unofficial leader of the open source revolution, Linus Torvalds, frequently walks a middle path when he weighs in on the inevitable open vs closed source debates. Not because he's trying not to rock the boat — he says what he believes — it's just that, refreshingly, his comments take a path of common sense, and are frequently hard to argue with.

A good example is his stance on the open-ness of open source. While organisations like the FSF promote an idealistic vision of open source and vehemently protect the principles of the GPL, Linus has said in the past that this vision of open-ness should apply to everyone, including commercial interests, which some open source advocates would prefer to limit. In Linus' view, in order for the freedom that the open source model allows to be preserved, you need to respect everyone else's freedoms too, even of those you disapprove.

This showed up again in one of Linus' beefs with the drafts of the GPLv3, in which he disagreed with the 'Tivosation' clauses that would prevent companies like Tivo from enforcing its DRM. While in principle an unpalatable technology, Linus saw the GPLv3's attempt to limit this as going against the essence of the freedom the GPL is actually trying to preserve.

Linux and open source poster boy extraordinaire, Linus Torvalds.

> THE MARKET WILL TAKE CARE OF ITSELF. GIVING CUSTOMERS WHAT THEY WANT IS THE WAY TO MAKE PROGRESS, NOT TO TRY TO CONTROL THEM

And recently, in an interview with Computerworld, he again made a poignant statement about the role of open and closed source and specifically of Linux and Microsoft, which again comes as an intelligent observation. Asked whether he saw open source and Microsoft as opposing forces, he said he personally doesn't see any conflict at all and that: "Some people get a bit too excited about MS, I think." He went on to say, "I don't think they are that interesting. And conversely, some MS people seem to get really hot under the collar about open source... I'd rather just worry about the technology. The market will take care of itself. Giving customers what they want is the way to make progress, not to try to control them or try to spread propaganda or FUD."

Which, of course, both sides are guilty of. It's another example of a well-reasoned middle line — for Linus, open source is a development model, it's there because and for itself, not because it's any sort of competition. That's by the wayside. That Linux competes and is a poster boy of open source is secondary to the development itself.

But, that said, there is obviously competition, and that's a *good* thing. Lets face it, there'd be drastically less impetus for desktop Linux without Microsoft and the Windows status quo, and far less improvement we've seen from Microsoft in the server space if not for Linux (just look at how far Windows Server and IIS has come).

So, while there always seems to be some level of philosophical and technical war raging across the web, it's a mistake to think the environment would be better without Microsoft or without open source. Both are here to stay, and both provide products and services that drive our world, and while everyone has a preference, it's ignorant to dismiss the other side outright. Competition drives innovation, as it always has. Linux owes part of its success to Microsoft, if for nothing more than a drive to do things better. apc

LinuxWindow

by Ashton Mills

Editor of the Linux Pocketbooks *series, and now with CHOICE magazine, Ashton has been a tech journo for over 12 years, including five years with* APC.

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Dumb managers, lawyers and doctors – again.

Dumb end users aren't just newbies — a recurring pattern is the stupidity of senior managers and executives.

Steve Griffiths, a server/network specialist from Christchurch, New Zealand, recalls that the IT general manager in a previous company was probably underqualified for the job. "One day, while demonstrating how to use a particular application setup on a laptop, we were advising him to use the 'mouse' buttons next to the trackpad in front of the keyboard. He looked at us in surprise — and then with wonder when he pressed the buttons and saw that they worked just like normal mouse buttons. He asked us if they had always been like that! He'd had the laptop for several months, and he'd never even tried to work out what they were." Steve, what's horrific about this tale is that the end user was your IT manager. "It became the source of the team's jokes for months afterwards," says Griffiths. We're not surprised.

MANAGER PLUGGED IN

David Williams, chief information officer at ResCo Services in Newcastle, NSW, recalls setting up a laptop for one of his company's managers in a remote office. "He called me when it arrived to say he couldn't log in; it didn't accept his password. Talking to him, I discovered he was merely typing in his password and ignoring the 'administrator' pre-filled as the username. However, even after he changed this to his own username, he still could not log in. I knew he wanted to copy some files from his old laptop and wondered if he had plugged this one in to a network socket that wasn't live. But no, when I asked, his response was, "No, it's not plugged in to anything. Do I need to do that?" These manager stories — we're wondering, how many more do we need to establish a trend?

HOW TO CONFUSE A LAWYER

Jeremy Warnock does tech support for a medium-sized government-run legal office. He says: "Each year we have a small intake of lawyers fresh out of university, articled clerks (ACs). One year, an AC rang me to inform me that every few minutes his computer would make a beeping noise, and could I please fix it as it was getting quite annoying. So I went upstairs to see him and heard nothing. I opened a few windows, an application or two, still nothing. He insisted that if I waited I'd hear the noise. As I was about to tell him he was imagining it, sure enough, there was a 'beep beep'. 'See there it is,' he explained. I opened the drawer in his desk, pulled out his fancy new Motorola Razr and told him he had a text message."
Jeremy, you did the right thing, but, with lawyers, the trick is to tell them the problem is difficult to diagnose and then slug them with a long consultation fee.

BRAIN SURGERY

Jerome Speekman works in a computer store. One day a doctor stormed in and complained that he'd just bought a $4,000 PC and the floppy drive was faulty and made a terrible racket. Speekman's in-store tech support colleague said to the doctor, "I'll have a look at it for you, Doctor". Speekman recalls that the doctor replied, "No, not good enough, I want a new one," and was highly agitated. The store's techie then opened up the flap of the floppy drive, shook it, and a front door key fell out. He asked the doctor if he had a toddler at home. "Yes" was the reply. "Well, here is your front door key that we found in your floppy drive."

EndUser

from The readers of *APC*

APC readers who deal with new computer users or incompetent IT administrators share their survival stories.

"Oh, like... wow! My boyfriend is such a genius. He always knows how to fix my viruses."

Don't let this happen to you. Dust around your PC, and be sure to say no to cement dust!

IF YOU'VE GOT A GOOD COMPUTER PRACTICAL JOKE TO INFLICT ON END USERS, LET US KNOW!

CEMENT DUST

When doing tech support for a building company, reader Mark Laffan regularly went to new building sites to fix their PCs. He says: "At one site, the company had set up office in the lower level of a new building with PCs and printers. I opened up a PC that was not working and found the PC's motherboard covered with cement dust! It was really thick and very fine. The hard disk had packed it in after the dust had worked its way into the inner workings. I asked the secretary how all this dust had got into the PC. She said, 'Oh, some times this room is filled with dust! It's like a fog, you know.' She pointed up to the ceiling and said, 'It gets sucked down from the floors above through this duct above my desk.' My jaw sort of dropped after hearing this — if the PC had that much dust in it, what about her lungs? Anyway, every week I'd visit them and blow out the computers and clean out the printer as well. They went through one monitor, a few hard disks and a floppy drive. I don't know how many lung transplants the secretary went though though." This story would be funny if it did not involve some serious OH&S issues.

BAD BOY TECHIE

Techies have access to a virtually infinite supply of practical jokes. Tim Jones from Randwick, NSW, has one he tries for laughs. He says: "Pushing Ctrl+Alt+(Down Arrow) on the Fujitsu desktops at work makes the desktop flip upside down. This makes it an awesome prank to play on unsuspecting co-workers! One victim, after switching the screen on and off a few times called up the IT service desk. The lady at Fujitsu had no idea how to fix the problem. Eventually she suggested that the VGA cable was plugged into the video card upside down!"

We like it! If you've got a good computer practical joke that other readers can inflict on unsuspecting end users, let us know. If we get enough we might even award a prize for the best one in the December issue of *APC*.

RETRO BAD BOY

Bad boy techies are not a new phenomenon. Back in the '70s they were already having fun with dumb end users. Ian Harris writes: "I used to work in a company that had machines that read both 8in floppies and 5.25in floppies. For the uninitiated, these disks were housed in a thin cardboard envelope with a hole in the middle for the reader spindle and a slot for the read/write head. One guy there got an 8in floppy and carefully cut off two sides and re-glued the edges to make it the same size as a 5.25in floppy. Then had great fun watching people put it into their 5.25in reader, even though the hole for the spindle was nowhere near the middle!" We wish we could have been there to watch.

YOU'RE A GENIUS, DARLING

Once the tech help is provided, techies or power users do enjoy the adulation that comes with fixing problems. Go on, admit it. Taekyun Kim from Glebe in NSW has a girlfriend that often asks for help with computer problems. He says: "Every time she has a problem, she mumbles it's a virus. One day, she calls me for help because she could not save her PDF lecture notes from her university web site. She said she tried to click 'save', but it wouldn't work. When I had a look at it, I realised that one of her books was pressing on the space bar on the keyboard. I removed the book and saved the file. She was extremely happy and called me a 'genius'." Taekyun adds: "I'm happy to be a genius to my girlfriend. Lol." APC

WINNERS!

This month's published End User writers win a Microsoft Wireless Notebook Laser Mouse 6000 worth $99.95. The first laser mouse from Microsoft designed for notebook PCs puts ultimate performance in the palm of your hand. With new, proprietary high-definition laser precision, an ergonomic design and smart navigation features, the Microsoft Wireless Notebook Laser Mouse 6000 delivers more comfort and control than laptop touch pads and toggles. Featuring a snap-in receiver for easy storing and longer battery life, the Wireless Notebook Laser Mouse 6000 connects directly to a USB port. IntelliPoint mouse software (included) is necessary for full functionality.

SEND US YOUR CONTRIBUTION AND WIN A PRIZE!
Send in your tales of woe involving dumb end users or incompetent techies to ***apcenduser@acpmagazines.com.au*** and if we print it, you'll win a prize. You must supply contact details in order for us to verify your contribution.

In line with expectations

How many 'isolated' incidents does it take before there's real recognition of a *community* problem? Watchdog investigates.

Back in December last year, my G4 17in PowerBook suddenly had a pixel-wide line appear on the display. I did my research and found about 120 other 17in PowerBook owners with exactly the same problem — what's more, all but a couple of these laptops had emerged from the Shanghai W8 factory in March/April 2005. Of course, all our laptops are now out of warranty. More and more G4 owners get in contact every day. There are now four pixel-wide lines on my display. We initially communicated via forums on Apple's support site — but then Apple removed the forums without explanation. I contacted Apple support in late January to discuss the issue. They asked to see photos and, over the last two months, have only replied to my calls with "the engineers are looking at it". You can see the evidence here:

- **www.crosspond.com/apple.php**
- **http://powerbook17lines.blogspot.com**

I finally got hold of someone in customer relations today, who said that Apple would not be fixing the problem, as "not enough people have come forward with this issue to suggest it is a manufacturing problem." I explained to them that it appears the issue is concentrated to perhaps just a few hundred laptops originating from W8 at a specific point in time — certainly, this is what the evidence points to — but they were unwilling to consider this. I don't know what to do next, short of calling in lawyers. I would rather pay solicitors to get Apple to fix this, rather than pay Apple a cent to repair something that all the evidence suggests is a manufacturing fault. Have you heard anything of this issue, or Apple attempting (apparent) cover-ups along these lines?

Ben Beath
Melbourne, Vic

The web sites Ben referred to certainly suggest that the pixel-line issue (known around the net as 'Bridget Riley' laptops, after the English 'optical artist') is a real problem for many PowerBook users. In addition to these two sites, there are numerous online forums, wikis and galleries related to the phenomenon and dedicated to attracting publicity to the fault in the aim of securing a product recall from Apple. These sites assert there are now over 200 "substantiated claims" of screen malfunction. In the interests of Ben and these customers generally, Watchdog contacted Apple and asked what the company had to say to its user base and APC readers about the issue and whether Apple had a policy in place to deal with these affected laptops? At first, an Apple spokesperson was only able to tell us that: "Apple has been in contact with this customer, however we have not yet seen the unit. Until the unit is received and the suggested problem reviewed, we are not in a position to comment other than to say we will continue to follow-up directly with the customer."

Ben confirmed that Apple had subsequently been in touch in relation to his affected PowerBook and that he would be taking the unit in to an Apple service centre. Later, Ben told us:

Dear Watchdog,
It's all been resolved — albeit strangely. I dropped the laptop in to the service centre a couple of weeks back, and they returned it two days later, having replaced the LCD panel. There was no charge. . . the service guy simply said that "Apple would look after it." Thanks for any assistance your enquiries provided!

Ben Beath

Still not having heard back from Apple with an explanation for Ben's free repair — nor a comment on the Bridget Riley issue (and Apple's policy in relation to it) generally — we once again invited Apple to comment. Specifically, now that Apple had seen, reviewed and repaired the unit (and free of charge), what was the problem with it? Given that the machine was out of warranty, why did Apple decide to repair it? And did Apple's response in this instance indicate that other users with the same problem could also expect to have their PowerBooks repaired?

Dear Watchdog,
As with any concern a customer has, we always request customers contact Apple direct. In this instance, the unit was reviewed by an Authorised Apple reseller in consultation with Apple and the customer to gain resolution. I would recommend any customer with a concern contact Apple directly to ensure their individual concerns are addressed.

Fiona Martin
Public Relations Manager
Apple

Watchdog pointed out to Apple that Ben already had contacted Apple prior to APC's involvement (and had been refused assistance). We asked again what prompted Ben's free repairs, what made Ben's situation different from the other users on the net? And if Apple didn't have a policy in place to deal with the wider problem, what amount of affected units/users would constitute a sufficient number for the company to look into this? We received no further responses from Apple. Watchdog encourages any users affected by this issue to look into the considerable community resources available online, as detailed above, in addition to contacting Apple about their "individual" concerns.

Seeing things on your PowerBook's display? Take a number and get in line. . .

TO ERR IS HUMAN

Edward Luck, of Lynbrook, Vic, wrote in to *APC*, telling us how he had read with interest the 'Home Improvement' story in July's Watchdog (page 27) and saying that the account of Boris Aguilar (who had experienced significant difficulties in getting Optus to connect his new home's phone and broadband) had reminded him of his own relocation struggles.

"Mr Aguilar appears to have suffered a very similar fate to myself with Optus relocations. In my case, I was renting a house in Cranbourne, Vic, while my new home was being built. When I attempted to relocate my Optus ADSL internet service (via Telstra wholesale) to my new address in Lynbrook, nothing happened for two weeks. I was told 'it is being connected' numerous times, before finally – after some irate phone calls – being informed my ADSL service had been connected to an address two doors down from the house I was renting! At this point I was completely flabbergasted and made this patently clear to Optus, who kept bouncing me back and forth between the regular internet folks and the 'relocations' department – each of which appeared to have a different idea as to what was going on. I believe these are systematic problems caused by Optus' relocations department not being correctly trained. I'm sure some of the personnel are quite smart and know how to make things happen, but any system such as this needs to be workable by *morons*. That way, human stupidity won't result in poor service such as this."

Watchdog asked Optus what it had to say about Edward's contention that systematic problems are plaguing Optus' relocations practices. An Optus spokesperson told us: "Optus welcomes the opportunity to respond to concerns raised by customers. We value our relationship with our customers and the feedback they provide us. We continually strive to improve the relationship and the level of service we provide to them. Every member of our customer service team receives extensive training prior to taking any calls from customers – ranging from four to six weeks depending on their job type."

Moving house? Make sure your phone and broadband get packed as well!

PLEASE EXPLAIN?

Having been a customer of ISP Netspace for a number of years, I recommended them when my daughter Wendy asked my advice prior to setting up a broadband connection. I checked availability in her area and she duly filled in the online application form. A couple of days later, Netspace told her an upgrade in her area was taking place — they offered her a free dialup service until the upgrade was completed, but were not able to tell her when that would be. I called Netspace on her behalf to cancel the application, as she really didn't want dialup and wanted to try another provider.

Alex from Queensland wants to know what the go is with Netspace broadband...

I spoke to a very polite customer service operator who offered to cancel the application for a fee of $70! I explained that the application was made only after being advised that broadband *was* available. As this was not the case, and as he was not able to tell me when the upgrade would be completed, my daughter should not be charged for the cancellation. He refused to budge on this matter, repeating only that it was company policy.

I find the above totally incomprehensible — it hardly relates to good customer relations. In my view, Netspace is misleading potential customers and should not be accepting their applications without first advising them whether broadband is available at that time. I would appreciate a "please explain" answer in your column. Also, perhaps this letter will be a warning for others to ensure that broadband is actually available at the time of application.

Alex Hosking
Runaway Bay, Qld

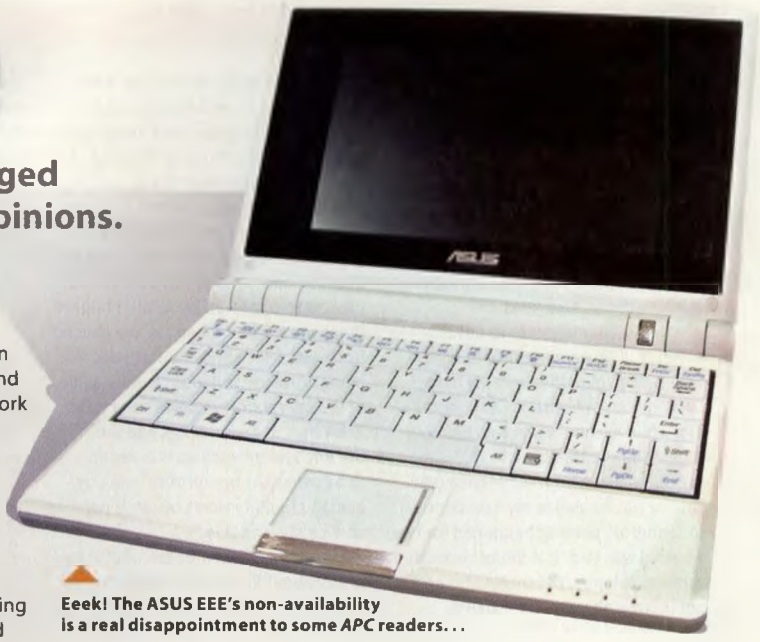
Watchdog contacted Netspace with Alex's concerns and were told by a spokesperson that: "Unfortunately, because the person who wrote the letter is not the account holder, for privacy reasons Netspace cannot comment. Netspace prefers to deal with customer service issues directly with the customer, rather than via a third party, and is happy to speak with the customer directly if she wishes." We were later informed by Netspace that the matter had been resolved and the customer had been refunded. Alex confirmed this and told us his daughter was now seeking another ISP, but repeated his concerns about Netspace's customer service. After refusing to comment on this, Netspace told us: "We do not wish to comment for the very reason that Wendy wishes not to comment publicly and said the matter is now closed which it is. We respect her wishes and the matter is closed. Netspace values customer feedback and is working to improve our customer service, as we acknowledge that there is always room to improve. In Wendy's case, we took on board her feedback and offered her a refund, which is what she had originally requested." abc

watchdog@acpmagazines.com.au

Has an IT vendor or telco stuffed you around? Let us know about it and we'll chase them for a solution on your behalf. Letters sent to watchdog@acpmagazines.com.au must include the writer's full name, street address, suburb, state and phone number to be considered for print publication (please also include details such as invoice numbers and people you've spoken to). Address and phone details will not be published. All correspondence becomes the property of *APC* and is subject to editing.

Vista on the nose

Our Vista Epinions special has encouraged other *APC* readers to also share their opinions.



Eeek! The ASUS EEE's non-availability is a real disappointment to some *APC* readers...

VISTA MUST DIE

In March I bought a new Dell XPS notebook (T7400/2GB) with Vista Home Premium, as well as a swag of new gadgets and software and looked forward to revelling in Telstra's wireless world.

In short — the laptop is brilliant but runs like a two-legged dog on Vista...

My new Telstra 3G USB wireless modem operated for four months without a compatible driver, forcing me to turn Vista UAC off (not very good!) until a new driver was released, which I was never advised about and discovered by accident.

Meanwhile there was an obscure incompatibility with McAfee Anti-Virus which initially prevented the Telstra USB modem working at all! By an extraordinary stroke of luck, the tech help operator I got at Telstra may have been the only person in that organisation who remembered (vaguely) that a setting for the "Xmas" virus buried deep in McAfee's Intrusion Detection settings had to be disabled for the modem to be recognised.

I loathe the Search function and Advanced Search function which is a vast step back to the Jurassic Age, and have nothing but contempt for Vista's bloated resource-hogging. I have now disabled all Aero effects and frippery in Vista and it still runs like a dog on this top-end laptop.

I will install XP Pro SP2 as soon as I get my hands on a version, and deeply resent that I will have to fork out yet more money, and spend hours completing my Vista Un-Experience. Die Vista die!

Howard Gipps
Willoughby, NSW

VISTA IS GOOD

After reading your article regarding reader issues with Vista, I wanted to write in with some positive Vista feedback.

Firstly, most issues seem to centre around drivers. I cannot see how third party vendors not providing updated drivers is a Vista issue. Vista was in beta for over a year, so if vendors could not develop their new drivers in time for release, the finger of blame should be pointed at them. Other issues such as Outlook pre-2003 not working are unfortunate; however, in order to move forward, some backwards-compatibility must be sacrificed. The measure of a good operating system is if, once using it, you don't like going back to the old one. I think this is true of Vista. Some great points I like:

- As I use a laptop, the sleep functionality has been greatly improved (ie. it works). I reboot maybe once a week and the system is very stable.
- Integrated media centre — including TV recording functionality — is great for home use with a great interface.
- Aero interface: while many criticise memory consumption, what most don't realise is that it first utilises graphics card memory instead of RAM, leaving more RAM available for applications. That being said, I have had to switch off the sidebar, as this seemed to really eat up memory.
- Vista pre-fetch really does work. Boot times are noticeably faster and frequently used apps open faster.

Many are lamenting the lack of backwards-compatibility, but I find the backwards-compatibility impressive. All peripherals work correctly, and I have yet to find software that I cannot run, including many games over five years old designed for Windows 98.

Andrew Smith
Woollomoloo, NSW

L OF AN IDEA

When is someone going to design and build a PC case that goes with LCD monitors? It'd be L-shaped. The LCD would fit inside the 'L'. The motherboard, PSU and hard drive(s) would be behind it in the upright arm of the 'L'. The DVD drive would go in the bottom arm of the 'L' facing forward along with

letter of the month

IF IT'S BROKE, FIX IT

It amazes me to see what broken things people throw out. It's now a common occurrence to see almost-new computers being thrown out because they are broken. When I say broken, I mean blown PSU or RAM, which are things that can easily be fixed for less than $100. So, in theory, it's cheaper to repair than to replace, so why fork out $1,000 for a new computer when you can easily repair it? Sounds crazy! I can't see any reason why someone would want to throw a whole computer away, just because one part of it is broken. Why not keep it for spare parts, or give it to your kids to explore and learn about computer parts? In fact, if I saw a broken computer out on the street to be thrown out, I would take it home, just so I or someone I knew could get some parts or even a whole new computer out of it. And even on the odd chance that it didn't work or it wasn't able to be fixed, then at least I could give someone who hasn't had the opportunity to look inside a computer before a chance to — and maybe inspire them to follow one of my passions.

Brad Coates
Albury, NSW

Brad wins this issue's Letter of the Month prize, a Logitech Cordless Desktop MX 3200 Laser keyboard and mouse set valued at $199.95.

So much for all the iPhone hype — it's not even available in Australia yet...

keyboard, mouse and USB sockets. Unless someone's got a better idea.

Gordon Drennan
Burton, SA

NO CHEAP LAPTOP?

Recently there has been an amazing amount of internet hype surrounding a new breed of laptop quoted as costing just US$199 for the base model. It is reportedly being released by ASUS into mainstream retail stores right around the world, except for Australia. Whilst the product will be available here, it will be on a strict 'tender-only' basis, meaning that the everyday people, students, businesses, families and the like will miss out on a wonderful opportunity to be welcomed to the digital revolution.

Being a student myself, I can picture the benefits of these devices being available in the mainstream Australian computer market. Imagine a future where no student is without a computer, where everyone can access the internet and where everyone can enjoy the benefits of technology. I feel that only one thing can start, if not fully create, this vision: the release of the ASUS EEE PC into our country's major retail stores.

I just hope that our retailers can talk ASUS around, and soon. We need this product now, not months and months behind the rest of the world.

Nick Dadson
Launceston, Tas

IPHONE DISAPPOINTMENT

Thankyou *APC* for your informative piece on the iPhone. I was just about ready to source the first iPhone off the product line but, alas, Australia's ability to make choices that keep us out of step with the rest of the world, not to mention Apple's choices, has cut us off at the post yet again. No 3G compatibility! Jeez. And there's no way I'm tying myself to Telstra.

C. McKenzie
Melbourne, Vic

UBUNTU FOR NANA

I think the best story about Vista is the one from an IT consultant mate of mine. He's a Microsoft Reseller and when asked by Microsoft to give his opinion of Vista he stated as follows: "I think that Vista will be the single biggest driver of Linux to the desktop ever". For some inexplicable reason, Microsoft hasn't replied to him yet! For my family and myself, I've already migrated my partner to Ubuntu Linux. I have also migrated my elderly mother over to Ubuntu (it's easy enough for an 81-year-old to understand). My brother (a former systems administrator) is interested in Ubuntu, and I'll be keeping my Win2K and XP boxes going until I have migrated completely over to Ubuntu myself and then Windoze can depart from my desktops. Under no circumstances will I upgrade to Vista!

Peter Mainstone-Mitchell
Ringwood East, Vic

Ubuntu: the operating system for everybody!

G9's HOT AIR

Each day I read in the print media the thousands of people who write in to support foreign-owned companies against our own Telstra. To Mark MacArthur, your memory needs work. Telstra refused to build the FTTN network (not because the ACCC refused permission). Telstra refused to build the FTTN network because the ACCC (a non-telco body which has no idea how a telco is run) wants to dictate the access pricing policy to a network that Telstra would be funding a majority share. It does not make business sense to build something and give it away for free. Remember, Telstra is now (thanks to the federal government) a public company, and no longer a social service. It has responsibilities to deliver returns to its shareholders. If Mark is willing to wait for the G9, feel free to wait. The G9 proposal is all hot air and their proposed access charges to the FTTN are higher than the access charges the ACCC wanted Telstra to charge if it wanted to build the FTTN. Go figure.

Rayhann Chee
Kew, Vic

epinions@acpmagazines.com.au

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This month in Labs. . .

Charge the energy banks

Battery life is a huge thing in mobile technology. Personally, it's my biggest point of consideration when I buy anything that needs to run away from the wall, far above raw performance or form factor. This really shows — it was until 2006 that I still carried one of those plain-Jane ugly Nokia brick phones, with the uncoloured liquid crystal screen, beepy ring tones and lumpy buttons. It really did all I required; I could make and receive phone calls and send and receive SMS — no camera, GPS, fingerprint reader, video playback or, heaven forbid, MP3 player you can shake to mix your playlist. What it had though, was almost two weeks of battery life off a single charge. I'm terrible at remembering to charge my mobile devices, and this suited me down to the ground.

Unfortunately, that old Nokia met it's end on a holiday in North Queensland. Let's just say that the phone didn't enjoy the warm blue waters as much as I did. Since then, I've moved on to a Motorola phone, which has oodles more functionality (that I don't use) and half the battery life, so it spends more time sitting on my desk or in my bag out of charge and doing nothing.

What I'd like to see, as phone manufacturers lump more and more options into smaller and smaller phones, is just as much effort going into battery technologies. It's 2007: we should be able to last longer than four days without a charge!

The notebook guys are moving in the right direction though. Pleasingly, lots of technology is being put into making notebooks less power-hungry, making up for the lack of new battery tech. I was very impressed with the Sony Vaio (reviewed page 33) which I took overseas for a technical briefing. The notebook, using a combination of solid state hard disk drive and LED backlight display, happily chugged through a full day's work with Wi-Fi blaring and only got through two thirds of the battery. This is where we should be with portable computing — not hurriedly turning notebooks on and off to maximise the miserly two hours you can work.

I'm putting the call out. I'd be happy for the speeds and feeds of *all* mobile technologies — mobiles, PDAs and notebooks to be stopped for 12 months, while the engineers applied themselves with making them more power-efficient. Though the camera might be nice and the GPS wonderful, though the colour screen might play your YouTube clips (and you can even send animated smileys to people on your mobile), it all becomes moot when you run out of juice.

> MY OLD BRICK PHONE HAD TWO WEEKS' BATTERY LIFE OFF A SINGLE CHARGE – THIS SUITED ME DOWN TO THE GROUND

NICK RACE – TECHNICAL EDITOR

WHAT'S THIS?

Each month we get told about hundreds of new products and gadgets that we normally don't have space for in the magazine. In this new layout feature in the reviews pages, we will bring you wider coverage of what's new.

NEW VISION

Belkin has introduced what looks to be the iPod of Wireless-N routers. The $299 N1 Vision features Draft 802.11n networking and four Gigabit network ports, but the real selling point is the high-resolution screen that lets you see things like current upload/download speed, which users are currently connected to the router and how much each computer has downloaded in the last 24 hours.

www.belkin.com.au

BLU-RAY CAMCORDER

With high definition all the rage, Hitachi has launched the world's first Blu-ray disc camcorders, which record and output home movies in 1,920 x 1,080 Full HD. The two models will be available Australia from November, each able to burn Full HD movies to 8cm Blu-ray discs. The Hitachi BD70 records to a single Blu-ray disc, in either 7.5GB or 15GB double-sided (or DVD-RW, -R and +RW discs) while the hybrid BD7H also features a 30GB hard disk drive. Prices not yet available.

www.hitachi.com.au

Virgin Broadband

Richard Branson's new wireless landline/broadband service.

This new home phone service from Virgin Mobile offers oodles of free calls and home broadband for $60 a month. As such, it's significantly cheaper than $29.95 ADSL plans, which typically offer only a few hundred megabytes of usage at slow 256Kbit/s speed and end up costing at least $50 a month when you add line rental into the equation. And that's before you've made any calls!

With Virgin Broadband, you get unlimited phone calls to landlines nationally, as well as unlimited calls to Virgin Mobiles. On top of that, you get 4GB of broadband internet at 512Kbit/s download speed (though in our tests the speed ranged up to 700Kbit/s). The service is delivered over Optus' 3G/HSDPA network, so you can disconnect your phone line altogether.

Admittedly, with a 4GB limit and a ban on P2P, it's not a service targeted at typical *APC* readers. However, it's ideal for most average web/email/YouTube users. It's especially good for renters because there are no connection or relocation fees.

Setting up the modem is easy. It comes with the SIM card already installed — you just have to connect the power and turn it on. There are two ports: RJ11 for you to plug your home phone into, and an RJ45 ethernet port. There's also Wi-Fi built in for wireless connectivity. I tested HSDPA reception in Sydney's CBD and an inner-west suburb. Although HSDPA coverage obviously varies from place to place, I was impressed that, in my apartment, where I've been unable to get Unwired signals despite being in a 'green' coverage zone, the reception of Optus HSDPA was fine.

Calls made through the modem aren't VoIP; they're circuit-switched mobile calls, placed via the Optus mobile network.

The Virgin Broadband service is designed to be a complete phone line replacement, and comes with a standard landline phone number in your state's number range so people can ring you at regular local/STD costs. You can optionally port your existing home phone number to Virgin Broadband at no extra cost.

The modem itself is a GlobeSurfer II 7.2 from Belgian company Option. Virgin Broadband retains ownership of the modem, which is just as well, because they are very costly units. The chipset is capable of up to 7.2Mbit/s, which provides plenty of headroom for future speed upgrades, even if the maximum offered now is 700Kbit/s.

APC's speed test results were pretty much as promised by Virgin Broadband — on the whole, download speed was up around 500Kbit/s, but sometimes over 700Kbit/s. Impressively, upload speed was around 350Kbit/s, which shames the 64Kbit/s upload speed of Telstra's garden-variety 256/64Kbit/s ADSL connections.

A great aspect of the service is that, unlike many of the cheapest ADSL plans and virtually all other mobile broadband service on the market, there are no excess usage fees — if you exceed your 4GB of usage, the speed is simply throttled back to 128Kbit/s, which is still a usable speed for web browsing and email.

There are a few problems worth mentioning, though none of them are deal-breakers: the modem's Wi-Fi is switched on but unsecured by default; the modem disconnects from the mobile network when idle, and takes about 10 seconds to automatically reconnect when you try to access the net; if you have a power outage your home phone won't work; you still pay for calls to many numbers such as Optus/Telstra/Vodafone/3 mobiles (45c per min) and international numbers are really costly (from 45c - $1.80/min).

An extended version of this review is available at **http://apcmag.com/node/6796**.

Dan Warne

CONTACT	Virgin Broadband
ONLINE	www.virginbroadband.com.au
MARKET	Everyone
PRICE	$60/mth (24mth contract)

✔ Value over competition.

VERDICT ★★★★☆

✖ 4GB limit; no P2P.

A great aspect of the service is that, unlike many competitor products, there are no excess usage fees.

Acer Travelmate 5710

A decent performer that's real value for money.

CONTACT	Acer
ONLINE	www.acer.com.au
MARKET	Everyone
PRICE	$1,599 (Vista Home Basic)

✔ Value; battery life; performance.

VERDICT ★★★★☆

✖ Hefty; superseded Centrino.

One of the trickier areas of notebook shopping is the mid-size student/business machine. You can pay anywhere from $1,500 up to $3,000 and it's not unusual to see price differences of hundreds of dollars between similarly specced machines.

This all-round system from Acer is a good example. It's a well-priced 15.4in machine for less than $2,000, with a basic but decent Core 2 Duo configuration. More importantly it's a solid performer compared to some more expensive rivals.

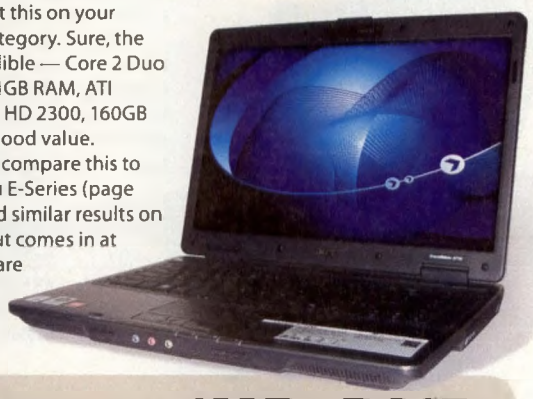
Testbench results were good, including a PCMark05 result of 3,792, which would have placed the Acer in the top half of the field in our July notebook shootout. The 3DMark06 score of 934 wasn't amazing, though stronger than many machines with integrated graphics.

Not only is the machine a good all-round performer but the battery life is also outstanding. Under low-power mode the Acer managed to last two hours, 45 minutes playing DVDs. That's one of the best results we've seen from a 15.4in machine.

All this would be good news in itself, but it's the price that put the Acer into the 'put this on your shopping list' category. Sure, the spec's not incredible — Core 2 Duo T5500 1.66GHz, 1GB RAM, ATI Mobility Radeon HD 2300, 160GB HDD — but it's good value.

For example, compare this to the 15.4in Fujitsu E-Series (page 32), which scored similar results on the testbench but comes in at $2,699. So what are you missing out on by not going for a system over $2,000? Well, this machine isn't the latest Centrino platform, so no 802.11n wireless or 800MHz bus. At around 3kg, this also isn't the lightest notebook in its class, but it's still quite portable.

William Maher



LG BH100 Blu-ray/HD DVD

HD DVD or Blu-ray. How about both?

CONTACT	LG
ONLINE	www.lge.com.au
MARKET	Everyone
PRICE	$1,799

✔ Plays Blu-ray and HD DVD.

VERDICT ★★★½☆

✖ Won't output 1080p at 24Hz.

LG's BH100 combination Blu-ray/HD DVD player lets you to dive into high definition without the risk of backing the wrong horse, but with convenience comes great sacrifice.

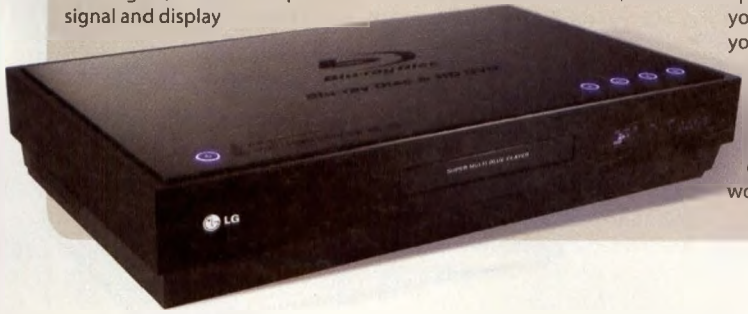
The BH100 is smaller and quieter than the Blu-ray players we've seen to date, but it's still painfully slow to load discs. It upscales DVDs to 1080i and also plays Blu-ray and HD DVD discs in 1080p at their native 24 frames per second — but this isn't necessarily the blessing it might seem.

While practically all high-definition televisions can accept a 50Hz signal, few can accept a 24Hz signal and display it at 24Hz. They either convert 24Hz to 50Hz or refuse to play it at all. At the same time, many Blu-ray and HD DVD players don't output 24Hz, they convert it to 50Hz.

Blu-ray and HD DVD support advanced surround formats such as Dolby Digital Plus and DTS-HD, but, in another disappointment, the BH100 down-converts these to Dolby Digital and DTS. The Ethernet port has also been hobbled, with LG labelling it a "service port" — disappointing considering the HD DVD camp is about to release discs that can access the internet to download extra content. While the BH100 will play the interactive Java content on Blu-ray discs, it doesn't support the interactive "HDi" features on HD DVD discs — a major drawback.

The idea of a Blu-ray/HD DVD combo drive is obviously appealing, but LG's BH100 asks you to sacrifice a lot in return. If you've only got a 720p or 1080i television and basic 5.1 sound you might not care, but if you've spent the money on high-end home entertainment gear then the BH100 probably won't do it justice.

Adam Turner



BLU-RAY DISCS

Remember the day you first heard the term DVD? It would have been in 1995 sometime. Now, you'll start hearing about the BD disc format, for Blu-ray discs. BD recordable/rewriteable discs are available in the standard 12cm diameter, but Verbatim has announced mini BD discs that are only 8cm (3cm) in diameter. Designed for camcorders, they can store 7.5GB of HD content and will launch in Australia when the first BD camcorders hit the market.

www.verbatim.com

SMB APPLIANCES

Unified threat management appliances normally provide comprehensive, industrial-grade protection for corporations, but Fortinet has released a new series for small offices and retail outlets. The FortiGate-60B and FortiWiFi-60B are affordable (naturally, if the market is small businesses) and provide all-in-one firewall, antivirus, virtual private network (VPN), intrusion prevention (IPS), anti-spam, web content filtering and traffic shaping for a small office.

www.fortinet.com

NEW YAHOO!

Yahoo! has released a new version of Yahoo! Mail. Improvements include the ability to chat in real time with members of both Yahoo! Messenger and Windows Live Messenger via a seamlessly integrated IM feature.

www.yahoo.com

WAKEY

One of the features of Intel's new vPro processor package for business desktops (which contains an Intel Core 2 Duo processor, Intel Q35 Express chipset and several security and management features) is the ability to wake and repair a computer with an inoperative operating system or hard drive. The new vPro can also protect virtualised OSs by isolating assigned memory through hardware-based protection, meaning it keeps data in each virtual partition protected from unauthorised access from software in other partitions.

www.intel.com

ENSURING HDTV

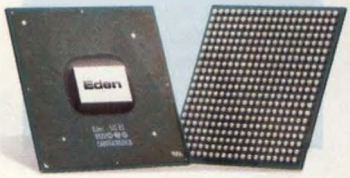
To try and prevent ongoing confusion about HDTV among consumers, the Australian Digital Suppliers Industry Forum (ADSIF) has announced a so-called High Definition (HD) certification 'tick' logo to identify which TVs have a built-in HD digital tuner and meet all Australian and industry standards for True HD. Some of these include sets with at least 720 active vertical scanning lines (720p), a tuner that's built-into or integrated with the HD display and HDCP-enabled HDMI output.

www.hdtick.com.au

LOWEST VOLTAGE

Taiwanese chipmaker VIA Technologies has released an ultra low-voltage x86 processor – with an idle power consumption of an astonishing 0.1 watts. Unfortunately, it won't turn up in your next PC since it's for use in a variety of embedded systems.

www.via.com.tw/en/index.jsp



Fujitsu LifeBook E8410

This is the top end of town in business notebooks.

We had a dig at this notebook on page 31, pointing out that it costs over $1,000 more than a similarly performing Acer Travelmate. So why the huge price jump? This is Fujitsu's flagship business machine, and it's packing a solid spec: Intel Core 2 Duo T7500 2.2GHz; 2GB RAM (+1GB Intel Turbo Memory); Nvidia GeForce 8400M G. The 3D performance isn't particularly notable, but otherwise this is a well-balanced machine, managing a strong PCMark05 score of 4,307, and lasting for about two hours, 20 minutes in our DVD battery rundown test. Both results would have placed it in the top half of the field in our last notebook roundup.

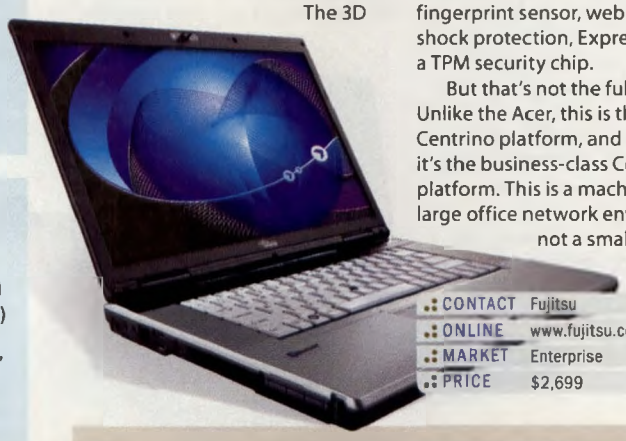
You also get extras like a fingerprint sensor, webcam, HDD shock protection, ExpressCard and a TPM security chip.

But that's not the full story. Unlike the Acer, this is the latest Centrino platform, and in this case it's the business-class Centrino Pro platform. This is a machine for a large office network environment, not a small home office.

Differences with Centrino Pro are enterprise-level features like Intel's Active Management Technology (AMT), helping IT admins do remote recovery, and Intel Virtualisation Technology (VT). It's a different class to the AcerTravelmate, with a different price structure that's on par with other vendors. For example, Toshiba's new Tecra A9 business machine with Centrino Pro is in roughly the same bracket at $2,585, with 1GB RAM and Nvidia Quadro.

Do you need enterprise-level features like TPM security chips and remote management? If not, jump down to something like Lenovo's 3000 N series for $1,899, which has the latest Centrino platform, but not the enterprise-class features.

William Maher



CONTACT	Fujitsu
ONLINE	www.fujitsu.com
MARKET	Enterprise
PRICE	$2,699

✔ Performance; corporate features.

VERDICT ★★★★☆

✖ Pricey.

Dell XPS M1330

A notebook that's light, compact *and* powerful.

Maybe it's the revamped Centrino platform, maybe it's the power-saving features like backlit LED screens, but we're definitely seeing a jump in performance and battery life since our last major notebook shootout in July. Take this skinny 13.3in Dell, which would have beat all the rivals in PCMark05. In fact, it even beats Dell's thumping Inspiron 1720 desktop replacement.

That's no small feat for a system Dell claims is the world's thinnest 13.3in notebook. Promoted as the "lightweight road warrior", it features Intel Core 2 Duo T7700 2.4GHz, 2GB RAM, Nvidia GeForce 8400M GS, 160GB HDD u7200, and classy touches like slot-loading DVD, HDMI and the backlit LED screen we mentioned earlier.

In our opinion, notebooks this size are perhaps the perfect portable — not too small, nor as expensive as ultraportables, but still considerably lighter than 15.4in and even 14.1in systems. In this case we're talking about a 1.79kg starting weight.

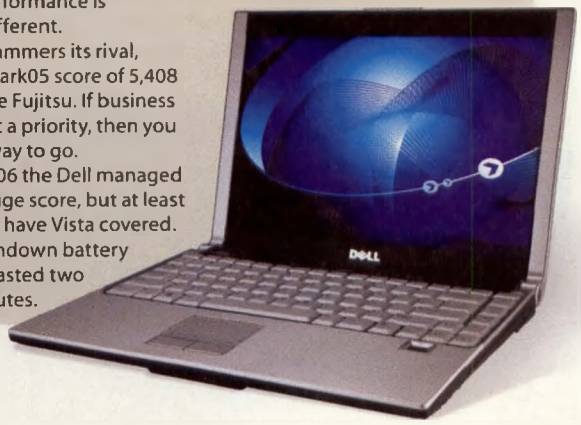
Lining the Dell up side-by-side with a business-focused 13.3in Fujitsu S Series model, makes for an interesting comparison. While the size/weight and battery life are on par, performance is completely different.

The Dell hammers its rival, scoring a PCMark05 score of 5,408 vs 3,552 for the Fujitsu. If business features aren't a priority, then you know which way to go.

In 3DMark06 the Dell managed 1,437; not a huge score, but at least you know you have Vista covered. In our DVD rundown battery test, the Dell lasted two hours, 18 minutes.

One final note: just because it's the "world's thinnest" notebook, doesn't mean others aren't also thin. Take the Fujitsu, which is 22.4-31.5mm high, versus 22.1-33.8mm high for the Dell. Side-by-side, the Fujitsu is actually a tiny bit smaller where the battery sits.

William Maher



CONTACT	Dell
ONLINE	www.dell.com.au
MARKET	Everyone
PRICE	$2,899

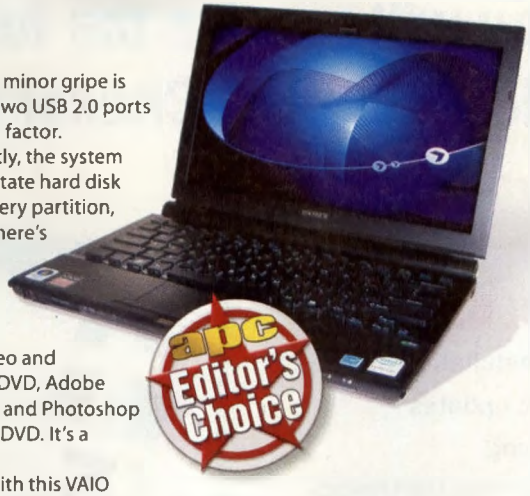
✔ Performance; light; compact.

VERDICT ★★★★☆

✖ Expensive.

Sony VAIO VGNTZ18GNX

Working for the longest time.



Both Toshiba and Sony have jumped on board the solid-state hard disk train, selling notebooks that only have solid-state hard disk drives. This Sony VAIO is their first in line, an 11.1in model weighing in at less than 1.2kg, including an optical drive (and battery). It includes an ultra-thin LED-lit LCD panel, running at 1,366 x 768. It's bright, clear and crisp with a reflective coating that attracts fingerprints.

It has an Intel Core 2 Duo U7600 running at 1.2GHz, so it's no speed demon. The default model only includes 1GB of RAM, which in our opinion is a little lean. It uses Intel's GMA 950 for graphics, providing basic 3D for Vista. 802.11a/b/g is supported as well as Bluetooth 2.0 with EDR, Ethernet, a 56K modem and DVD+-RW DL optical drive. There's ExpressCard and a Memory Stick Pro/Duo slot, as well as a built in webcam, all in a package 227 x 30 x 192mm. Our only minor gripe is that it only sports two USB 2.0 ports — a pretty limiting factor.

Most importantly, the system uses a 32GB solid-state hard disk drive. After a recovery partition, OS and software, there's only 11GB free. It's pre-installed with Microsoft Windows Vista Business, VAIO Video and Photo Suite, Click2DVD, Adobe Premiere Elements and Photoshop Elements, plus WinDVD. It's a solid start.

The big thing with this VAIO is the battery life. In battery-saving mode, we got over 8.5 hours of 'real work' done during a flight (with Wi-Fi off, of course). DVD playback sat at 5.5 hours, while in an office it easily lasted a full day's work with Wi-Fi on.

Nick Race

CONTACT	Sony
ONLINE	www.sony.com.au
MARKET	Everyone
PRICE	$4,299

✔ Battery life; design and form factor.

VERDICT ★★★★½

✖ Two USB; 64GB SSD is better.

HP Compaq 6515b

A business machine for tight budgets.

We're often asked if notebooks under or around the $1,000 mark are safe to buy. They can be, depending on what you're using them for.

This budget Compaq is a good example. It's a cheap buy pitched at the 'smart commuter', and the tradeoff for the price is portability and power.

For a start, this machine isn't particularly light, and it doesn't have great battery life (just under two hours in our DVD rundown test.) In our general-use battery test, where we select 'power saver' mode and run the battery down while browsing the web wirelessly, it lasted roughly two hours, 40 minutes (with lots of hibernation). Some more-expensive models can last the same period playing DVDs.

Performance isn't great either. During testing, the Compaq was very slow in power saver mode and struggled with basic things like loading the Windows control panel. With the power mode switched to maximum performance, the system ran fine, but it's still something to keep in mind.

The benchtest confirmed the story, with the PCMark05 result less than the sluggish 1kg LG A1 Express ultraportable we reviewed for our September issue (page 31). As expected, the 3DMark performance was negligible, though it's not a major problem on a work/student system like this.

Still, we found it did the job just fine in maximum performance mode, running multiple apps like browser tabs and media players under Vista.

This is also a cheap machine, which is a plus. The price is on par with entry-level systems like the Dell Latitude or Dell Vostro 1400. The Compaq also comes with business features like a common system image, TPM security and a fingerprint reader.

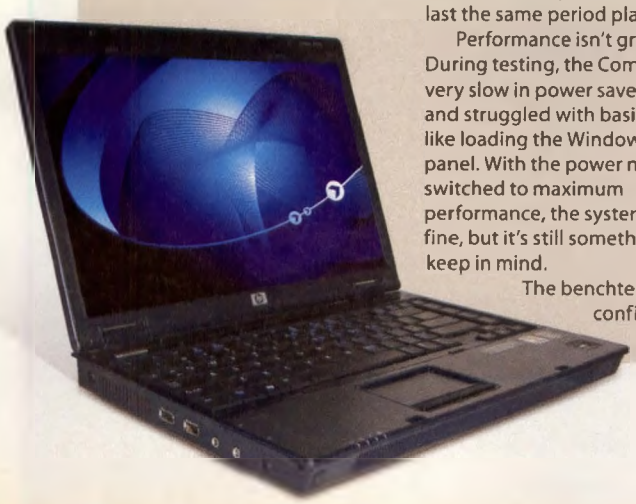
William Maher

CONTACT	HP
ONLINE	www.hp.com.au
MARKET	Everyone
PRICE	$999

✔ Cheap.

VERDICT ★★½☆☆

✖ Slow; poor battery life.



BENQ PROJECTOR

If you want the full-on, and we mean *full-on* home theatre experience, you need an HD projector that can do 1080p. Epson has a beauty, the EMP-TW1000, but BenQ now has one too, the W10000, which supports full 1080p and HD video 24 frames per second. This powerhouse comes with a 10,000:1 contrast ratio, a high brightness of 1,100 ANSI lumens and BenQ's own image enhancement technologies. It'll cost you though, $8,999 per unit.

www.benq.com.au

ASUS GPS

A new app that's now becoming de rigueur in the latest PDAs is GPS, with ASUS releasing the A686 and 696 PDAs with full global positioning system (GPS) capability. The handhelds are 1.57cm thick and include full GPS with an embedded, non-protruding antenna.

www.asus.com.au

OVERCLOCKING RAM

Taiwanese memory maker Transcend has released a special RAM for overclocking PCs, called aXeRam Overclocking Memory. So how is overclocking RAM put together? They pick the best-performing (thus, best-made) memory modules, test them in pairs until they go faster than they are supposed to, and package them up with a premium price tag.

www.transcendusa.com

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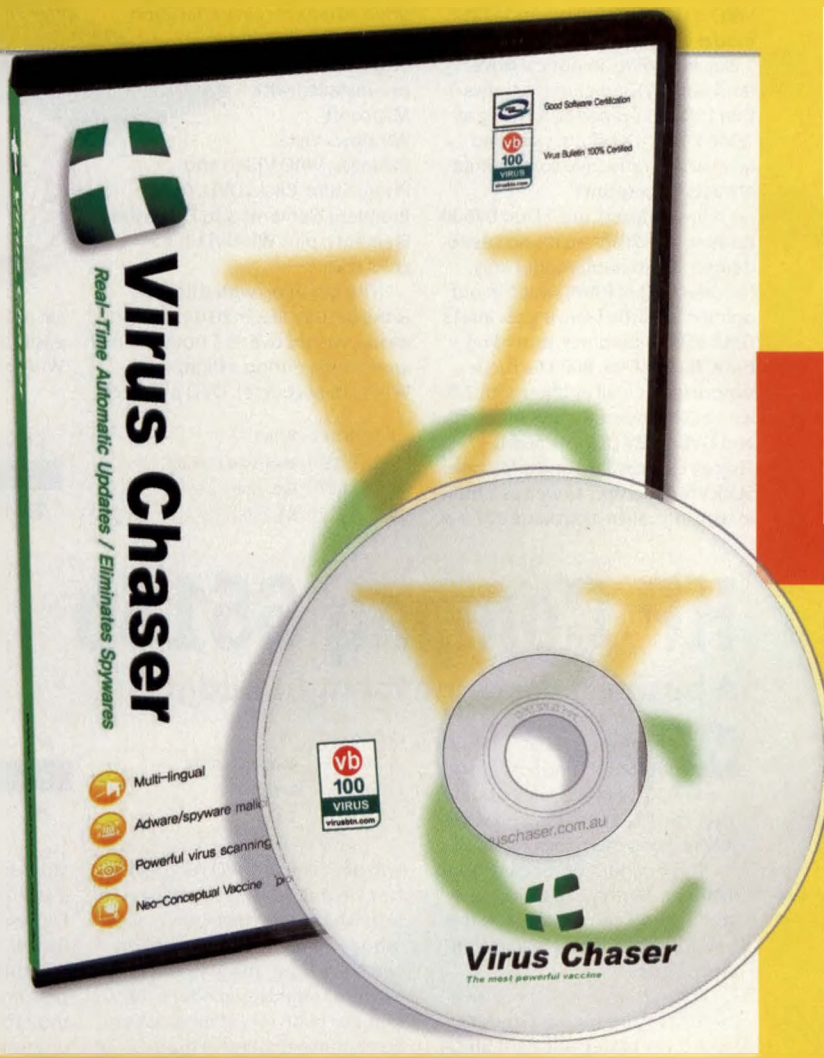

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JABRA SPEAKERPHONE

Jabra has launched a new Bluetooth speakerphone, the Jabra SP5050. Ideal for hands-free use in the car, office or home. It weighs only 75g and is compatible with other devices running Bluetooth 2.0. The SP5050 can be paired with up to eight devices (one at a time) and has an operating range of 10m.
Price: $149
www.jabra.com

ULTIMATE CANON

Think your 8 or 10-megapixel DSLR camera is impressive? The Canon EOS-1Ds Mark III is in another league, with its astonishing 21.1 megapixel sensor. The ultimate Canon DSLR also includes a 45-point AF system, shutter speed of up to 1/8,000 second and high-speed flash synchronisation of 1/250 second. It will be available from November for $12,999. That's a small price to pay for having the ultimate in digital photography.
www.canon.com.au

ZOOMING CANON

Canon has also added an ultra-zoom digital camera to its mass-market PowerShot range – the PowerShot SX100 IS. With an 8-megapixel CCD sensor, its key feature is the high-power 10x zoom lens with optical image stabiliser, which is able to take great zoom close-ups from a good distance. Should be available this month, price to be announced.
www.canon.com.au

Gigabyte Radeon HD 2600XT

Upper-mid performance at low-down prices.

CONTACT	Gigabyte
ONLINE	www.gigabyte.com.au
MARKET	Everyone
PRICE	$219

✔ Video enhancements; silent design.
VERDICT ★★★★☆
✖ Needs adaptor for HDMI.

Though Nvidia's 8000 series graphics cards have been dominating the market for some time now, ATI's 2000 series cards just keep getting better and better.

Our initial look at the HD 2900XT, ATI's flagship card, was a little disappointing, with pretty poor benchmark results when compared to similarly priced cards from the competition. In the few months the HD2000 series of ATI cards have been available, heaps of work has gone on under the hood in the driver package —and performance is increasing at a very respectable level.

Gigabyte's version of the upper-mid-range HD2600XT card is one of those solutions that fits the feature set (and price range) of the new ATI cards perfectly. This particular part is a 65nm GPU, running at 800MHz, with an 1100MHz memory clock. A 128-bit memory bus and 256MB of GDDR3 support the 120 shader units.

This implementation from Gigabyte includes a very large, well-ventilated fanless cooling system and, with the new video processing AVIVO HD tools included in the 2600 series, this card makes for a killer home theatre or low-noise graphics option. It's got grunt enough for games as well, scoring 4,695 in 3DMark06.

AVIVO adds off-CPU acceleration for deinterlacing and picture scaling, as well as dedicated functionality for decoding HD codecs. This will lower CPU usage during playback, further decreasing noise and heat. Add HDMI output to that (a full HDCP chain) and you've got a top-notch card for video and games.

Nick Race

MSI Diamond Plus

MSI hits the nail on the head, but what about connectivity?

CONTACT	MSI Computer
ONLINE	www.msicomputer.com.au
MARKET	Everyone
PRICE	$330

✔ Good performance; good price.
VERDICT ★★★½☆
✖ Hot and noisy.

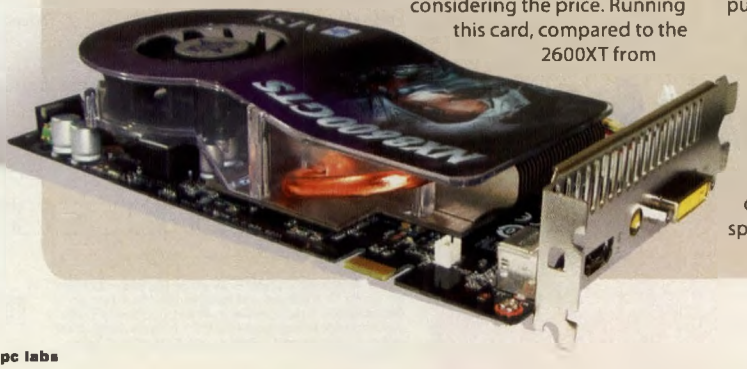
The 8600GTS cards from Nvidia are the sweet spot. At around $300, the price and performance graphs cross over and something magical happens. It makes a graphics card worth buying. MSI has hit the nail on the head on this graph, shipping an 8600GTS incarnation with enough grunt and enough features to make that $300 spend ultra-attractive.

The 8600GTS Diamond Plus from MSI is built with HDMI in mind. It forgoes one of the DVI connectors for the new video connectivity standard. It's handy if you have an HDMI-capable screen, but be aware if you're a dual monitor user — that might be a nasty surprise.

The card runs at the default 675MHz core clock and 2,000MHz memory, of which there is 256MB. On the bench, the 8600GTS Diamond Plus punched out 5,698 in 3DMark06 — a good score, considering the price. Running this card, compared to the 2600XT from Gigabyte (above) showed a big difference in the heat and noise between the similarly targeted components. Both include good video support and HDMI, with a good dose of 3D grunt, but the MSI runs much hotter and louder than the ATI card. If you are looking for a home theatre graphics solution, you better have a nice, cool spot to put the PC.

Noticeably, the MSI 8600GTS uses a four-pin molex connector, rather than the newer six-pin which plague the 8000 series of cards from Nvidia. This might make it an easier upgrade for those with older systems whose PSUs don't sport the six-pin plugs.

Nick Race



D-Link's Starter Pack is designed as an end-to-end solution for powerline networking.

D-Link Powerline HD kit

It might stream HD video, but these are two rather pricey plugs.

CONTACT	D-Link
ONLINE	www.dlink.com.au
MARKET	Everyone
PRICE	$179

✔ Traffic prioritisation; data encryption.

VERDICT ★★★☆☆

✖ Cited 200Mbit/s speed.

To call powerline networking a bandwagon is perhaps a cliché, but more and more networking vendors are jumping onto it. Why is a mystery. The core reason for buying a kit that can network non-wirelessly with high throughput is about to fall away with the arrival of 802.11n. The key selling point of 802.11n is that it can stream high-bandwidth files, including HD video. That's a shame for D-Link then, because that's exactly what its new plugs are designed to do.

STILL STANDARDS

Despite the fact that powerline adaptors from different manufacturers aren't designed to work together, they can if they use the same standard — much like wireless networks. D-Link's adaptors conform to the DS2 standard (**www.ds2.es**), but, in reality if you're going to set up a powerline network, we always recommend all your kit is from the same manufacturer.

As you would expect, the plugs are easy to set up. Powerline is designed to be simple. Just plug in, connect the Ethernet cables and install a software utility on one PC. The software part of the process — currently incompatible with Vista — configures the plugs and makes sure they have the same password, ensuring security, which has previously been perceived as a problem.

The LED indicators on the plugs are simple yet effective. Most other powerline kits don't provide this, and it's surprising just how hard it is to diagnose problems if you have no visual indication that your plug has either not detected any other plugs or, alternatively, doesn't even detect that it's connected to the Ethernet port on your PC.

SPEED ISSUES

This kit has a cited speed of 200Mbit/s, but, as with wireless, don't be misguided by such absurd figures. On our first attempt we got around 24Mbit/s of real-world throughput from the network and thereafter we pushed it to get around 34Mbit/s. These figures sound surprisingly low, but they highlight one of the major issues with this kind of networking — your network is only as good as your home wiring. And ours would, apparently, provide the Electrician of the Year with a real test. With old homes, you can expect your network to take a major bandwidth hit.

But there is a positive side to this. Our throughput figures are still good enough for all internet streaming and multi-room net access. More crucially for our verdict, they're also good enough to push a 19.5Mbit/s MPEG-2 HD file down our connection, though trying multiple streams didn't go too well. If you're lucky, though, you may well find that in a new house you can get these plugs to push 70 to 80Mbit/s, so you'll be instantly able to watch two or even three HD streams over your network. Standard-definition content transfers in multiple streams without difficulty, and we were able to get three streams playing quite happily alongside each other.

While this isn't the most impressive performance, it shows that D-Link's plugs are more than adequate for basic home networking or HD streaming. At well over $150 for two plugs, powerline has a big problem in terms of cost-per-connection. You can buy more plugs, of course, but it'll cost you. Once 802.11n has become more established, it'll be nigh-on impossible to work out why you would want a kit like this. Even so, there are still a few months left when you may consider this worth buying.

Dan Grabham

DVD RECORDERS

In the rush to high-definition TV, Blu-ray and HD DVD, it can be easy to forget that people are still buying DVD hard drive recorders. Panasonic has released three DVD recorders, each including a digital tuner for direct recording of digital TV broadcasts, a HDMI link for connecting to other home theatre devices, and 1080p up-conversion technologies for viewing the standard-definition output on HDTVs. The top DVD recorder is the $879 DMR-EX87, which comes with a 250GB hard disk for up to 443 hours of recording.

www.panasonic.com

HOT WEBCAM

It's becoming increasingly harder to have a bad hair day when using video with instant messaging. The newest webcams no longer hide imperfections, their quality almost that of camcorders. Logitech's $149 QuickCam Pro 9000 QuickCam is a webcam that features a Carl Zeiss lens with an autofocus system. It also records at up to 30 frames per second up to a resolution of 960 x 720 pixels.

www.logitech.com

.MORE AT .MAC

If you have an Apple Mac, the .Mac online service is indispensable, even more so now that Apple has finally upped its storage to 10GB, which puts it on a par with the storage you get on Google Premier Apps. There are also other enhancements, such as the .Mac Web Gallery, a new feature for sharing photos and movies on the internet, and improvements to the mail client.

www.apple.com/dotmac/

VEIN ID

Now that fingerprint security has been shown up by Gummi bears, makers of security devices are working their way deeper into the finger. Hitachi has created a finger sensor which detects vein patterns in fingers and incorporated this into a security device to manage computer logins. The finger vein pattern is impossible to counterfeit because the veins are inside the body. Light penetrates through the finger using a light transmission technique to allow the detection of the structure of the vein pattern.

www.hitachi.com

ITUNE STAGE

The Belkin TuneStage 2 plugs into your iPod and lets you play music from your iPod through your home stereo wirelessly. It's actually a Bluetooth transmitter that communicates with a receiver wired to your stereo system and lets you use the iPod to navigate and play your songs from up to 10 metres away. It provides up to five hours of playtime on a fully charged iPod. Price: $249.95

www.belkin.com.au

NU DOLPHIN MP3 PLAYER

The NU Dolphin MP3 Player is for when you *have* to listen to your MP3s while you're swimming or surfing. An ultra-light MP3 weighing only 25 grams, it has an earphone with a special non-woven fabric membrane to keep the speaker vibration plate dry and a soft silicon earplug that fits perfectly in the ears. With 2GB in memory, it has an operating time of eight hours when fully charged. Price: $189

www.nu-global.com

Ricoh GelSprinter GX3050N

Print with sticky ink.

The time has come for more choice in life than lasers and inkjets for colour printing. Obligingly, Ricoh has just launched some new competition, in the semi-liquid consistency of gel printing. Using cartridges broadly similar to those of inkjet printers, the new gel printers are quick and easy to set up, although even the smallest of the new breed, the GX3050, is a bit of a monster being much bigger than the average A4 inkjet.

CONTACT	Ricoh
ONLINE	www.ricoh.com.au
MARKET	Everyone
PRICE	$446

✔ 29ppm mono; duplexing.

VERDICT ★★☆☆☆

✖ 10ppm normal colour.

A major headache with inkjet printers in an office context is that ink cartridges seem to run out far too often and there are never replacements to hand when you need them. The GX3000 is slightly more maintenance-free in this respect, with a black cartridge that lasts for around 1,500 prints and three colour cartridges that last for about 1,000 prints each. This means that cartridges have two or three times the life expectancy you would expect from an inkjet.

Print speed failed to live up to Ricoh's claims in our tests, with colour DTP pages being printed at 10ppm, making the GX3050 slower than many inkjet printers. On the plus side, prints are dry and reasonably splash-resistant. Refreshingly, automatic duplexing comes as standard, as well as an Ethernet port for network printing.

The biggest question mark is over print quality. In our tests, colours lacked the vibrancy of inkjets and even most new colour laser printers, making the GX3000 lacklustre for DTP and document printing. Photo output was very second-rate, especially in terms of colour accuracy. Considering there aren't any savings to be made in running costs, the gel option seems to add nothing to the market that inkjet and laser printers don't already have covered.

Matthew Richards

Lexmark X4550

An ultra-affordable MFC with wireless connectivity.

An inkjet all-in-one, the Lexmark X4550 can be directly connected to a computer via USB, or shared across a Wi-Fi network (including WPA2-PSK). At 46cm wide, it's quite compact for an all-in-one, while the brushed aluminium and plastic look is somewhat unusual.

The wireless setup routine was painless, but you will need to locate the printer at least temporarily within a metre or two of the computer as a temporary USB connection is required. Drivers and software are included for Windows 2000, XP (including x64) and Vista, and Mac OS X for PowerPC and Intel. ABBYY OCR software is included for Windows and Mac.

Print, scan and copy quality all seemed good, especially given the relatively low price. There's an optional six-colour ink cartridge (it replaces the normal black cartridge with black, light cyan and light magenta) if you want to print photos, but it wasn't included with the review sample. Network scanning is PIN-protected.

CONTACT	Lexmark
ONLINE	www.lexmark.com.au
MARKET	Everyone
PRICE	$199

✔ Good features for the price.

VERDICT ★★★★☆

✖ No Ethernet or full LCD display.

Media cards (SD, MMC, xD, Memory Stick and CF) and USB storage devices are supported, and the X4550 can print a proof sheet that you mark with a pen or pencil and then scan to automatically print the required images. Memory cards are also accessible from network-connected computers.

Nominal print speed is 18ppm for colour documents. We recorded 67 seconds click-to-drop (from idle) for the first A4 page. Monochrome mode is nominally 26ppm; we recorded 34 seconds for the first page.

There's an internal power supply, but no hard power switch. The power button on the front panel puts the device into a low-power mode, or, if held down, turns it off.

Stephen Withers

Seasonic X900 PSU

No bells and whistles, just juice.

Highly Recommended

Seasonic is a brand that specialises only in power supplies. This Taiwan-based company has a good reputation amongst enthusiasts for high-quality, decently priced and very reliable PSUs — without the flashing lights.

We've said it time and time again in *APC*; a good, high-quality PSU can save you endless grief when building a new PC. Always overspec, use a reliable brand, and never, ever use the ones that come bundled in a $30 case. A big difference between a very low cost and a premium supply is this: low-cost devices can support the advertised wattage as a 'spike' — let's say up to 300W for a very short amount of time — versus a high-quality PSU that will sustain that 300W until the cows come home. The second difference is the device's efficiency: how much of the power is wasted as heat as opposed to usable to the system.

The Seasonic X900 is a 900W branded power supply with a peak output (spike) at over 1,000W. It sports 80mm fans to keep it cool, along with Silent Fan Control to keep it quiet at the same time. It is ATX12V- and EPS12V-compliant and extra connectivity includes nine molex connectors, six SATA power and four PCI Express connectors for graphics cards, so it's very SLI- or CrossFire-friendly.

It includes over-power, over-voltage and short circuit protection and a three-year warranty. If you want a simple, effective, high-quality power supply that will handle nearly everything you could fit in to a PC case, then you can't go wrong with this.

Nick Race

CONTACT	Powerhouse PC
ONLINE	www.powerhousepc.com.au
MARKET	Performance enthusiast
PRICE	$345

✔ High quality; efficient; warranty.

VERDICT ★★★★☆

✖ Expensive.

HARRIS DELL

Trying to emulate the Dell approach, Harris Technology has partnered with Acer to launch a 'Build Your Own PC' program on the Harris Tech site. It allows users to custom-build an Acer desktop PC by choosing from the range and upgrading it. The custom-built PC is then delivered within 5-10 business days.

www.ht.com.au

PANASONIC BLU-RAY

High definition is not just about the picture – Panasonic's new DMP-BD10A Blu-ray Disc Player incorporates a decoder that supports the latest 7.1-channel surround sound formats, Dolby TrueHD (a lossless multi-channel audio codec), and its competitor, DTS-HD High Resolution Audio. The DMP-BD10A is available now, priced at $1,649.

www.panasonic.com.au

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ROOTKIT DETECTIVE

McAfee has released Rootkit Detective, a free tool to help computer users clean their machines of rootkits. Typically a rootkit arrives in a Trojan horse or via malicious download. Rootkit Detective uncovers hidden processes, registry entries and files and scans the integrity of a PC's kernel memory to display any modification.

http://vil.nai.com/vil/stinger/rkstinger.aspx

WIRELESS PROJECTOR

Sanyo has launched a lightweight, wireless projector with a big punch, the $4,499 PLC-XU111 LCD. With a brightness of 4,000 lumens and 3.3kg weight, it's well-suited to business. It also features wireless (IEEE 802.11 b/g) capabilities with automatic settings for fuss-free connection to a laptop or PC.

www.sanyo.com.au

MAINFRAME CAREER

Mainframes may not hog the limelight when it comes to what's cool in computing, but they're still around and are still a career option. So much so that the University of Canberra in partnership with Global Online Learning (supported by IT giant IBM) is offering a three-year Bachelor of Information Technology (Mainframe Computing) and a Master of Information Technology (Mainframe Computing). The bachelor's degree will take IT talent recruited after the first year of an IT-related degree at any Australian university or completion of a TAFE Diploma.

www.canberra.edu.au

Mio C520

apc Highly Recommended

Mio ups the ante with a high-end device and mid-range pricing.

Mio's Digiwalker C520 is a huge step forward from the GPS receivers it released a few short years ago. With a 4.3in, 480 x 272 wide-screen display and zippy 400MHz processor, it's able to quickly calculate routes and show plenty of detail.

The mount is very sturdy and there was no perceptible wobble when driving. The default display provides a view of where you currently are on two thirds of the screen. The rest of the display shows a digital dashboard with route and other information. Speed limits are also shown on the screen where the maps, Sensis R14, knows them.

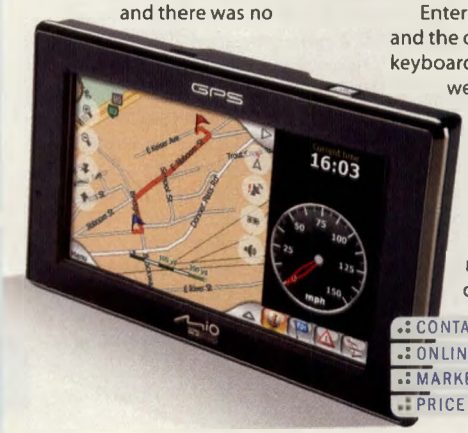
Entering a route is very simple and the on-screen QWERTY keyboard is easy to use. Once we were moving, the Mio Map software (now at release 3.3), used Text-to-Speech so that driving instructions included street names rather than the usual "turn left in 400 meters". The only complaint was there was no easy way to change the speaker volume.

Running Windows Mobile 5, the C520 is more than just a GPS receiver. It's also a Bluetooth hands-free kit for your mobile, a media player and a digital photo display. There's an SD slot so that you can look at images straight from your camera.

Rounding out the package is Mio's desktop software, called MioTransfer, for syncing contact information from Outlook to the C520 and moving audio and images from your PC to the device.

The Mio Digiwalker C520 offers great bang for buck, with features that, until now, have only been found in more expensive devices.

Anthony Caruana



CONTACT	Mio
ONLINE	www.mio-tech.com.au
MARKET	Everyone
PRICE	$699

✔ Wide-screen; text-to-speech.

VERDICT ★★★★☆

✖ Speaker volume.

BlackBerry Curve 8300

apc Highly Recommended

The best BlackBerry yet?

We're going to go out on a limb and call the Curve the best BlackBerry yet. It may not have the built-in GPS of the 8800 or the tiny footprint of the Pearl, but it wraps everything the BlackBerry does best into a sleek and curvaceous 111g.

From a design perspective, there's little – if anything – to fault: the shapely dimensions make it exceptionally comfortable to hold, the trackball allows for easy menu navigation, and the thumbboard keys are well-spaced and tactile.

The killer app is still email, and while this isn't as full-featured as on some other smartphones (plain text messages and attachments only, for instance), it does the job more efficiently than most. You can team it up with a BlackBerry Enterprise Server for push-based access to email and other PIM items, or configure the BlackBerry Internet Service to retrieve messages from up to ten email accounts.

Apart from a new spell-check feature added to email and memos, the productivity apps are largely unchanged. Instead, RIM has focused on improving the multimedia experience. It's still no iPod, but it's now easier to find stored pictures, music, movies and ringtones, and you can use your own headphones thanks to the standard 3.5mm audio jack.

It's a shame the Curve has stuck to the same quad-band GSM/GPRS and EDGE radio stack, with most smartphones now boasting 3G, HSDPA and WLAN. If you do a lot of web browsing and downloading, you'll feel the slower connection. Battery life won't disappoint, though – with medium usage, you'll get 3-4 days of use.

Jenneth Orantia

CONTACT	BlackBerry
ONLINE	www.blackberry.com
MARKET	Everyone
PRICE	$739 (Optus)

✔ Svelte form factor; good keyboard.

VERDICT ★★★★☆

✖ No 3G, HSDPA or WLAN.

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Register online at www.tpg.com.au or call 1300 360 855

TPG

SIGMA EF-500 DG ST

If you do decide to splurge $3,295 on the SD-14, then you may as well chuck another $400 in and add one of these to the bill. We all know how useless inbuilt flashes are, so the EF 500 will come in handy when you need to get that important shot in low light.

www.sigmaphoto.com

CANON HG10

Canon's first hard disk drive (HDD) digital video camera offers 40GB of storage and a combination of a 1,920 x 1,080 True Progressive HD CMOS sensor. With direct-to-HDD recording technology, the HG10 eliminates the need to purchase or carry recording media.

www.canon.com.au

THIS ROBOT SUCKS!

The new iRobot Roomba 500 series, robotic vacuum cleaner has added features including the ability to automatically program weekly cleanings, a one-button activation system, technology to detect when the device is approaching a wall or obstacle, anti-tangle abilities and a cleaning system that automatically changes based upon the floor's surface.

www.irobot.com

Sigma SD-14 DSLR

A 14-megapixel DSLR? Now this we've got to see.

CONTACT	Sigma
ONLINE	www.sigmaphoto.com
MARKET	Performance Enthusiast
PRICE	$3,295

✔ Great feel; great image quality.

VERDICT ★★★½☆

✖ Too complicated; too expensive.

With Canon and Nikon dominating the market, it's good to see the return of another respected name from the past. With the SD-14, Sigma has introduced a DSLR that is a worthy successor to the SD-10.

At 1.276kg, the SD-14's body carries a fair bit of weight. With a rubberised grip complemented by well-placed controls, it has a solid feel in your hands. The shutter release and rear-panel controls are all within easy reach and are where you would expect them.

A strange thing we noticed was that the rear-mounted 2.5in LCD screen seemed a little lo-res. When images were directly compared to those displayed on a monitor, the quality of the inbuilt LCD didn't do the images justice.

The menu access controls are a bit of a fiddle as well. With only one command dial covering several functions, it takes a bit of effort to make adjustments. With the Fovean X3 sensor, the SD-14 did a great job of capturing rich and accurate colours. Saturation was impressive, as was the capture and rendering of hues.

The Auto White Balance performed well enough, but quality did suffer slightly in artificial lighting conditions. Autofocus and shutter speed were both responsive without being exceptional.

With 14 megapixels, the SD-14 is a camera that captures large, sharp images with great colour. As the controls are a bit of an effort and require the user to work hard for the results, we recommend this one for the professionals only. For the rest of us, we believe there are better and cheaper alternatives on the market.

Christopher Zammit

Casio Exilim EX-Z1200

A point-and-shoot that remembers your friends (how nice).

CONTACT	Casio
ONLINE	www.exilim.com/intl/
MARKET	Everyone
PRICE	$649

✔ Good image quality; face detect.

VERDICT ★★★½☆

✖ Frustratingly slow at times.

Twelve megapixels in a digital point-and-shoot camera. "Do we really need that many?", you may ask. The basic answer to that question is no!

The megapixel count still seems to dominate discussions about digital cameras. Most people think that the higher the megapixels, the better the picture quality. Casio has obviously cashed in on this trend with the release of its 12.1 megapixel, Exilim Z1200. Lucky for them, they have produced a well-made camera that manages to take good quality images at large sizes.

The Z1200 feels quite sturdy in the hand and has a feel of strength and weight inside its compact body. The external controls can be a bit awkward and small, but no more than other compacts. A good menu makes accessing the new features such as face detect and image stabilisation a breeze.

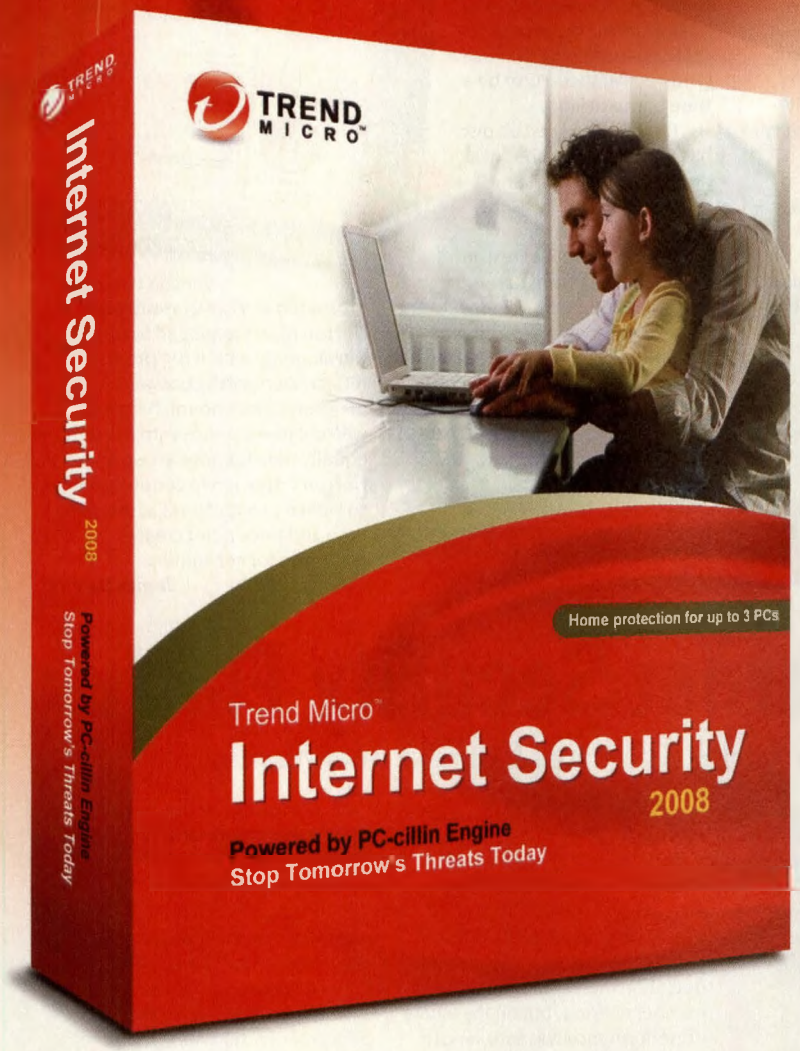
Face detection has been around for a little while now, but the Z1200 takes it a step further. Face recognition allows the camera to remember the faces of people you know, find them in a crowd and adjust the focus and exposure that best suits them. Voila: friends in focus, strangers not. Aperture priority, shutter priority and manual exposure modes allow for good control, although the poor range of ISO settings lets it down.

The Z1200 captures large, sharp images if you give it time to work. For posed photographs and landscapes it works a treat, but it can get frustrating to use if you try and catch an action shot or photograph something in a hurry. With the slow focus and zoom you will most likely miss what you were trying to shoot.

Although not ideal for sport photography or the enthusiast, the Exilim Z1200 gives great results... as long as you're not in a hurry.

Christopher Zammit

Stop tomorrow's threats today.



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MOVIE SCOUT

If you live on Windows Live Messenger and love movies, you want to check out the new Movie Scout. It helps you find movies and session times at cinemas near you. Add Movie Scout to your contact list and say 'Hello' to start the conversation:
moviescout@ninemsn.com.au

TALK TO VISTA

A version of Dragon NaturallySpeaking Preferred 9 that's compatible with Vista is now available from Nuance Australia.
http://australia.nuance.com/

STORAGE BOOST

LaCie has boosted capacity of its Ethernet Big Disk to 2TB, with a price of $1,349. The 'Ethernet Big Disk 2TB' is for centrally storing and sharing files over a network between Windows, Mac OS and Linux machine.
www.lacie.com

COMPRO ON

One of the problems with using TV tuner cards to record TV shows is that you need to leave the PC on – not good if you're going to be away for a few days or more. Compro's new VideoMate E700 comes with a neat feature called S5/S4/S3 mode Power-Up Scheduled Recording which will turn on the PC, record your desired footage and then turn off once complete. The $199 Videomate E700 comes with a PCI Express interface and lets you watch up to four digital programs at once, schedule recordings, play recorded files and so on.
www.anyware.com.au

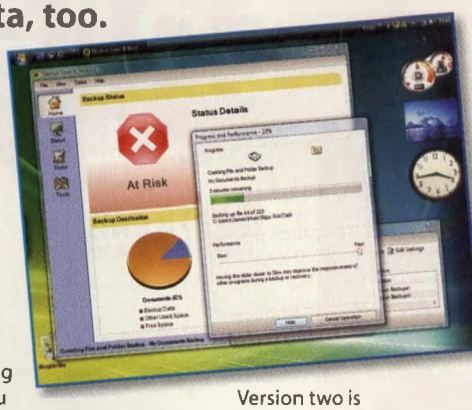
Norton Save and Restore 2

Now this backup program can do Vista, too.

Norton's simplified version of its Ghost software employs the same successful hard-drive cloning technology as its sibling, adding an individual file backup system to appeal to consumers. Version two offers supposedly faster backups and compatibility with Windows Vista.

The program is designed to make backing up your files easy, using a Wizard format and suggesting a comprehensive weekly schedule from the outset. The first thing you'll see is a red cross with the words 'At Risk' beneath it. This is difficult to remove, and no matter how you configure your backups, it won't go away until you've imaged every hard drive in your system. We're used to seeing stark warnings within Norton's Antivirus software but, in a backup program, such scare tactics pander only to those who believe their PC to be a time bomb ticking.

The provided rescue disc has seen the most changes, now containing the same Windows Vista shell as the operating system's install procedure. As well as restoring an entire drive, from here, you can operate on your Windows install, scan for viruses and map a network drive. It's a well-crafted boot disc and the best part of the package — useful to anyone having problems that can't be fixed from within Windows.



Version two is promoted as Vista-compatible, but Norton hasn't managed to update terminology within the program to reflect Microsoft's changes.

There's not enough here to warrant its existence with the now equally user-friendly Ghost, and Norton's decision to continue two so similar product lines at the same time and price point creates confusion for consumers.

James De Vile

CONTACT	Symantec
ONLINE	www.symantec.com.au
MARKET	Everyone
PRICE	$69.95

✔ Good interface; Vista-"compatible".

VERDICT ★★★½☆

✖ Not the fastest on the market.

CA Internet Security Flash

CA's Internet Security Suite has found a new home.

CA has recently re-released its Internet Security Suite on a 2GB flash stick. The installation file is just under 50MB, leaving massive amounts of space for the user's own enjoyment. This is the way we would love to see other manufacturers moving.

CA Internet Security is a compilation of antivirus, antispyware, antispam programs and a personal firewall. It blocks adware and pop-ups, provides help against identify theft and spam. On paper, CA Internet Security has the required breadth of features to keep any Windows user safe and happy. Thankfully, it mostly measures up to its promise.

The performance and memory consumption of the software is good. It consumes about 46MB of RAM while idling in the background and about 56MB while scanning. In our antivirus assessment tests it performed well, finding 686 viruses out of 697 in the first test and 628 out of 633 in the second. The spy- and adware detection mechanism missed a number of items, but on the whole its performance was satisfactory.

The CA firewall is solid and easy to use. It's also vaguely reminiscent of Zone Alarm. Here the user can manage cookies and block scripts and pop-ups. Inbound and outbound email scanning and defence is good to have too. Unfortunately CA's anti-phishing capabilities are not entirely satisfactory. Unlike other security suites, it doesn't come with an anti-phishing web site filter.

In terms of usability, CA's focus is on simplicity and ease of use. The user interface is intuitive, responsive and, maybe, just a bit dull. All-in-all CA Internet Security Suite can be seen as a capable and robust performer. It's hard to say whether the included USB key will sway a lot of customers CA's way. The software, however, is good enough to sell itself.

Peter Sbarski

CONTACT	CA Australia
ONLINE	www.ca.com/au/
MARKET	Everyone
PRICE	$129.95 (3 PC licence)

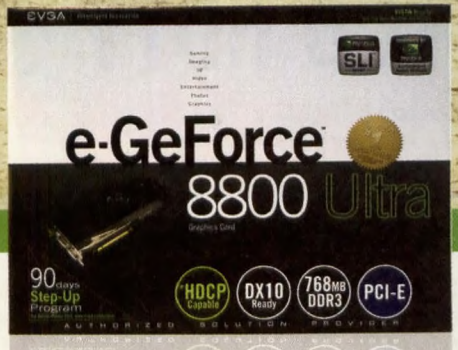
✔ Fast spyware and virus detection.

VERDICT ★★★☆☆

✖ Poor anti-phishing protection.

EVGA

USA's No.1 Graphics Card has been booked again...



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WA	That Computer Shop	08 9362 2777	www.thatcomputershop.com	Vtech Industries		www.vtechindustries.com.au
QLD	Pinnacle Computer Systems Info. Technology Support Direct	07 4638 0826	www.pinnacleonline.com.au www.itsdirect.com.au	PC Shopper	07 3397 0777	www.pcshopper.com.au
TAS	Tasmanian Principal Computers	03 6234 5677	www.tasmanianpc.com.au	Taspro Computers	03 6424 1911	www.taspro.com.au

TOMORROW'S TECHNOLOGIES — TODAY

APACER STYLE

Why do some MP3 makers still take the foolhardy approach of trying to compete with Apple's iPod on style? We're told Apacer's new Audio Steno AU350 is "an absolutely stylish MP3 player." With up to 2GB of flash memory, the AU350 is not even that small, at 7cm long and 2.9cm wide.

www.apacer.com

TREND MICRO

Security software and services company Trend Micro has enhanced its InterScan Gateway Security Appliance for mid-sized businesses with web and email 'reputation' services. Reputation? Does that mean they do character assessments of people who send you emails? No, it's a fancy way of saying Trend Micro's appliance checks the senders' IP addresses against a database of IP addresses know for spamming.

www.trendmicro.com.au

HOME ENTERPRISE

It won't be long before many home users will have network storage that resembles that used by enterprises. Iomega has launched a NAS server for home and small business that's one of the first terabyte-scale devices available for $1,500 or less to offer true hot swappable drives. This means that one of the four hard drives in the StorCenter Pro NAS 150d Server (in either the 1TB or 2TB models) can be replaced while the server is in operation. The server will then rebuild the new drive into the existing RAID 1 or 5 arrays without any interruption or downtime. Now *that's* cool.

www.iomega-asia.com

Grundig Cinemo 40

Old-school stylings and an average experience.

Grundig is a respectable brand of consumer electronics that has been churning out medium-to-high-end gear since the '40s. But is it finally losing its luxury status in the digital age? The Cinemo 40 is a ho-hum screen that passed through the *APC* Labs this month. Not bad by all accounts, but the others outshone it.

It's a 40in (101cm) 720p HD LCD TV with built-in speakers and tuner. It sports the usual swathe of connectivity options, including two HDMI ports, two composite, two S-Video and a single set of component inputs. Its contrast is 1,200:1 and is in native wide-screen format with a resolution of 1,377 x 720. Video playback showed it deals with bright colours very well — it's clear and well-defined in light areas of the pictures — but like many mid- and low-range sets, it turns into a mess of mud where dark detail is needed. It doesn't suffer from blur too terribly, there are worse examples out there, but it's no plasma. The menu system is comprehensive and easy to navigate, but it covers too much of the screen. The built-in speakers were fine, but you'll want something with more oomph for that cinema experience.

Its stylings seem quite 2005, with a large silver bar down the bottom of the screen, but it makes it look more like a TV than some of the large black holes a pure piano finish creates. All in all, the Cinemo 40 is a well-priced screen with middle-of-the-road performance.

Nick Race

CONTACT	Grundig
ONLINE	www.grundig.net.au
MARKET	Everyone
PRICE	$2,699

✔ Low price; decent speakers; vivid.

VERDICT ★★★☆☆

✖ Mediocre film experience.

Samsung 40in LCD HDTV

A solid LCD TV with Samsung's usual pizazz.

The imaginatively named LA40M81BD from Samsung is a 40in LCD HDTV with some serious stylings and performance to match. Showing Samsung's strong history with LCD panels for all manner of devices, the M8 is raising the bar for image quality among flat-screen TVs.

The 40in (101cm) 40M8 is a wide-screen HDTV, supporting full HD, or 1080p resolution, with a screen res of 1,920 x 1,080. This model includes a HD tuner, which looks excellent with free-to-air HDTV broadcasts. The screen also supports three HDMI inputs, two component inputs, two composites for that old DVD player in the corner and a PC D-Sub connector for some geeky gaming. The screen's tuner is fully featured, and onscreen menus are a pleasure to use. The included 2 x 10W speakers in the screen are pretty weak; you wouldn't want to rely on them for a movie experience.

Colour and contrast on the 40M8 are excellent, showing surprisingly deep blacks for an LCD panel and vibrant, colourful images. The system states a 15,000:1 contrast ratio and 8ms refresh, though both are unable to be tested independently. The screen surface is reflective, similar to the branded, bright viewing coatings found on some newer notebook PCs, so beware of lights behind the viewer. The screen's design is sleek and shiny with a piano-black finish; it might look a little imposing in a smaller room.

Overall, the Samsung LA40M81BD is a solid choice for 1080p HD viewing — it has good contrast for an LCD, a good tuner for telly and plenty of connectors — just pretend the speakers don't exist.

Nick Race

CONTACT	Samsung
ONLINE	www.samsung.com.au
MARKET	Everyone
PRICE	$4,399

✔ Good contrast; vivid colours.

VERDICT ★★★½☆

✖ Speakers are poor; expensive.

Sony Bravia 52in X Series

Sony reckons it's "simply put, the best" LCD telly.

So, what does $9,999 worth of LCD TV get you? This baby: the Sony Bravia 52in X Series (52X) monster — straight out of a sci-fi movie set. This silver behemoth is arguably the best 1080p LCD TV on the market — though the technology in LCD panels is changing so quickly, it might not hold the crown for long, considering Sony's got ten new full HD models coming out this year.

With an image on it, the Sony glows. Pictures are clear, bright and vivid, with colour reproduction saturated and vibrant, giving a three-dimensionality to the image that really works. On the flip side, it deals well (though not as well as a plasma, mind you) with reproduction during dark or 'black' images. Smearing or ghosting with fast-moving images wasn't noticed too readily. The built-in HD tuner, in conjunction with the 'Bravia Engine' used for cleaning up fuzzy images is effective. HD content from free-to-air sources looked excellent — this is definitely a dream screen for the World Cup!

The 52X is over 1.4m wide and almost 90cm tall when sitting on its table stand — an imposing piece of furniture for any room. Thankfully, the silver colour scheme and perspex edging does break it up a little, so it doesn't seem to cover an entire wall. For the fashion-conscious, Sony offers black, blue, red, brown and white bezels for $699 as well. Inputs are generous, including two HDMI, three component inputs, two S-Videos, one VGA and three composite connectors.

Nick Race

CONTACT	Sony
ONLINE	www.sony.com.au
MARKET	Everyone
PRICE	$9,999

✔ Size; image quality; multiple inputs.

VERDICT ★★★★☆

✖ Price.

LG LB9 (42LB9DF)

Stylish, but don't watch SD on it.

When the main feature being promoted by the maker of a new HDTV is its stylish black pearl finish, you automatically become suspicious that the underlying technology isn't strong. And so it was when we fired up LG's new 42in LCD HDTV. Finished in deep shiny black with a stylish ring-shaped stand, the LB9 will look great in the lounge room. But when it comes to the picture, it's an unusual package.

As you would expect, HD content looks good on its full HD 1,920 x 1080p resolution screen, but upscaled standard definition (SD) TV is rubbish — jagged and full of artifacts, not to mention occasional screen shudder. With the majority of TV still broadcast in SD, the ability of a high-def TV to rescale SD signals matters, and here the LB9 lets itself down. By contrast, some HDTVs do a tremendous job upscaling SD, such as the Philips WL8A HDTV we looked at in a previous comparison. The overall picture quality of the LG places it among the current generation of LCD HDTVs rather than the newest, advanced crop which includes the Samsung HDTV reviewed here or the new Toshiba Regzas. On the positive side, the LG has an astonishingly fast screen refresh of 5ms, which is as fast as it gets for an LCD TV — sure to keep the jaggies down when watching sport. Its contrast ratio of 10,000:1 should make for deeper black levels, although we couldn't see any difference to other TVs with lesser contrast ratios.

Our overall impression is that it's trying to be a style/value contender, forgoing picture quality at the lower end to offer itself up as a big 42in LCD TV at around the $3,500 mark on the street.

Tony Sarno

CONTACT	LG
ONLINE	http://au.lge.com
MARKET	Everyone
PRICE	$3,799

✔ Stylish; large; fast screen refresh.

VERDICT ★★★☆☆

✖ Poor SD broadcast quality.

NEW XBOX

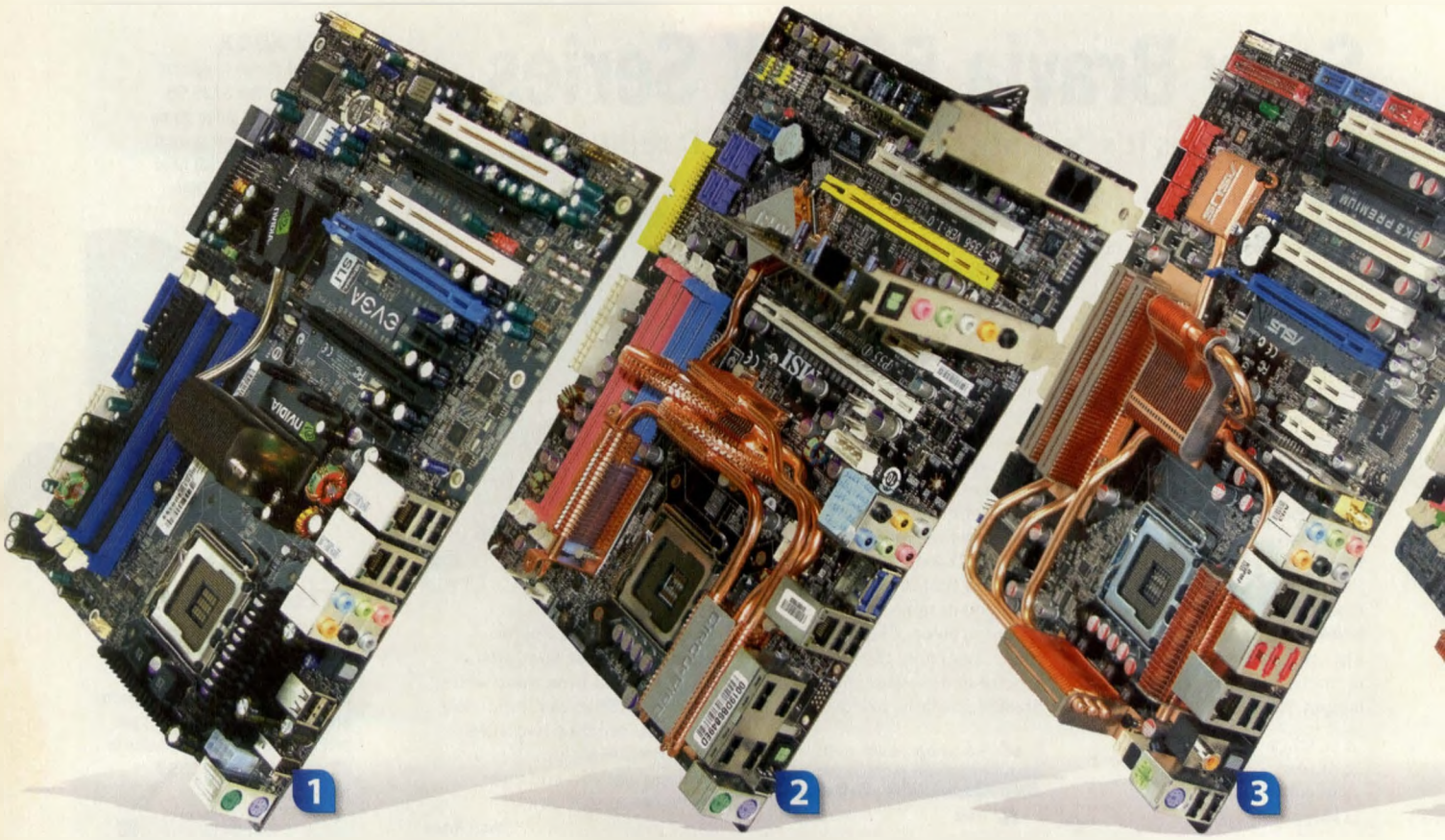
The Xbox family keeps on expanding. The $729.95 Xbox 360 Elite video game and entertainment system comes with a 120GB hard drive, HDMI port, HDMI cable, wireless controller and an Xbox LIVE headset. It joins the Xbox 360 and Xbox 360 Core consoles. ***www.xbox.com/xbox360***

STYLISH STYLUS

If you need fast print speeds, then Epson's Stylus Photo RX690 all-in-one inkjet photo printer should keep you happy – it churns out documents at 40 pages per minute, and 4 x 6 inch photos in 12 seconds. RRP is $399. ***www.epson.com.au***

CUSTOM MOUSE

If you think a mouse is just a mouse, try telling that to gamers. It's for them that Logitech has released the Logitech G9 Laser Mouse which can be customised to the extreme to fit the needs of any gamer. It has interchangeable grips, on-the-fly dpi switching, USB laser tracking, an onboard-memory profiling system, weight tuning, a custom-colour LED and a fast Precision Scroll Wheel. Price: $169 ***www.logitech.com***



Foundations of the new PC

Want to build a top-notch PC? *Nick Race* looks at premium motherboards from six vendors.

The success of Intel's Core 2 Duo processor line is unbounded. Coming from behind in the performance and enthusiast sectors, the Core microarchitecture turned the heads of the speed geeks and ousted AMD's Athlon X2 range from the top of the performance pile.

Having a top CPU is only one part of the equation — it's hard to realise the potential of a good chip unless the supporting equipment around it (RAM, graphics and storage) are also of a high calibre. Where it all comes together is with a top-notch motherboard. It's like building a house — you want a solid, well-built foundation, or nothing else will hold up.

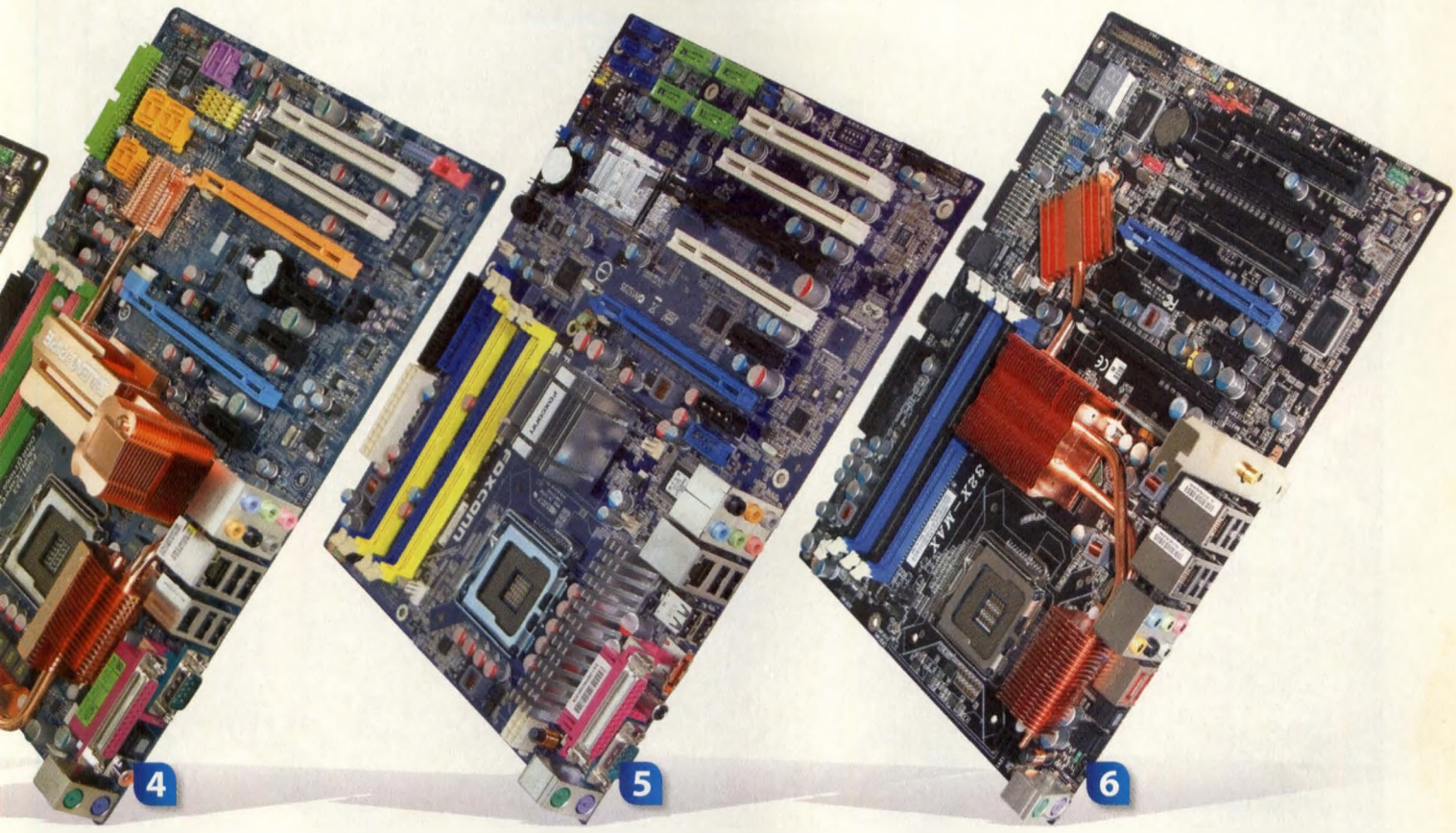
With this in mind, *APC* has taken the cream off the top of the motherboard market, as we examine the best performers for a Core 2 Duo or Core 2 Quad system. We've mixed a combination of DDR2 and DDR3 P35 motherboards, with some Nvidia 680i performance monsters and a healthy dash of forward looking scepticism.

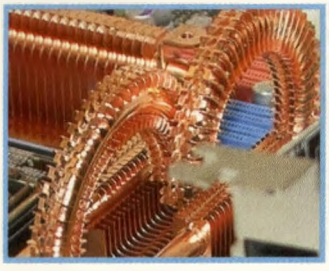
THE MIX

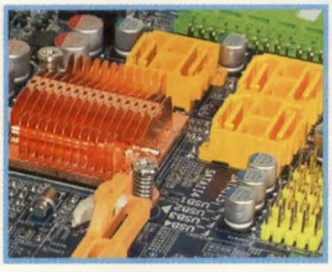
We rounded up top-of-the-line motherboards from six different vendors, each representing the best the vendor had to offer at the time. Four of the motherboards that came in used the Intel P35 chipset, by itself not Intel's premium performance part, but the enthusiast price/performance sweet spot while we wait for the high-end X38 chip. EVGA's top-of-the-line and the Abit board we chose, are 680i-based motherboards — a chipset which is older than the P35, but which was built with a long lifespan in mind: its specs are still up to par.

The Nvidia 680i-based motherboards support SLI video card combining functionality, while the Intel boards support CrossFire for ATI cards.

We received boards from the previously mentioned EVGA and







NICK RACE – TECHNICAL EDITOR

Nick Race is *APC*'s Technical Editor. He has been benchmarking and testing PC equipment full-time since 2004 and views every product with a critical eye. Apart from specialising in x86 server hardware and desktop/business storage products, Nick is also responsible for the smooth running and pertinent testing in the *APC* Labs.

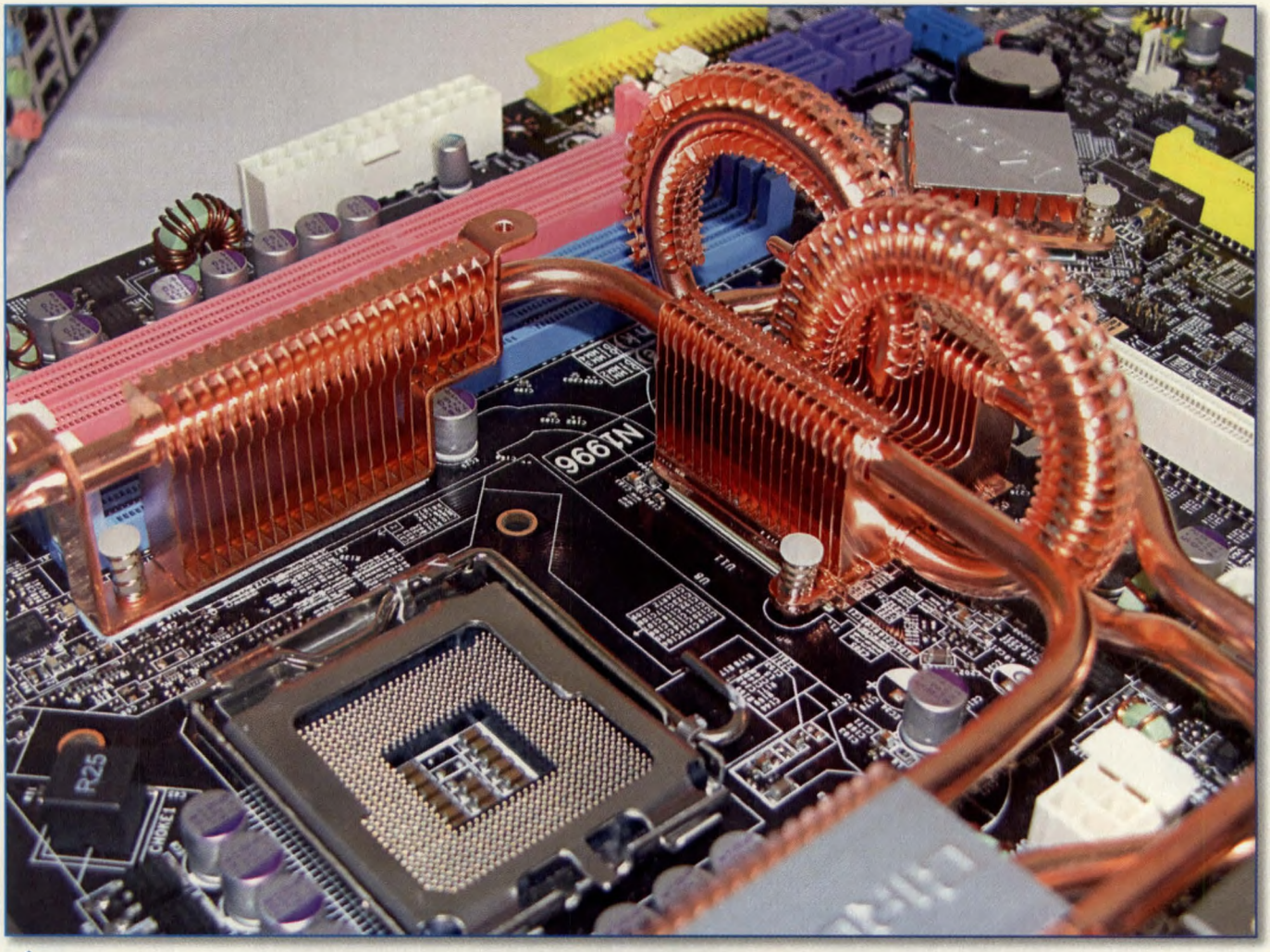
Abit, as well as Gigabyte, ASUS, MSI and Foxconn. This represents a huge proportion of the motherboard market as far as brands go. There's a good chance that when building your own PC, or buying one from a reseller, the board will be one of these brands.

Some of the boards have appeared previously in *APC*, but something's changed. The driver support for the boards and the new 1,333MHz frontside bus CPUs and DDR3 memory improvements will see changes in the performance from our initial and early testing. It's one of those rare situations mostly seen with graphics cards, where the performance of the hardware improves with age as the drivers become more mature. It's positive to see, as it shows those responsible for the chipset haven't just 'dropped it and run'.

DDR2 AND DDR3

We purposefully included motherboards using both DDR2 and DDR3 memory modules (as well as one special case). This is purely based on DDR3's current pricing. As the new memory format is priced triple what you'd pay for tried-and-true DDR2 modules, it still doesn't make a lot of sense to spend loads of extra money on a minor performance increase. As with every generation jump in the memory market, the initial offering is high-priced, average performance and often very hard to buy. DDR3 is already getting better, as prices have dropped from their initial breathtaking heights, but it will still be a while until the price of the DDR3 modules makes sense with the potential performance increases it offers.

The 680i-based motherboards do not support DDR3 memory at all, whereas the P35 boards usually come as an option for DDR2 or DDR3. There might be some other differences between the boards, so make sure to check before putting down your hard-earned.



Complex cooling systems have evolved to keep chipsets cool.

> IT'S ONE OF THOSE RARE SITUATIONS WHERE THE PERFORMANCE OF THE HARDWARE IMPROVES WITH AGE AS THE DRIVERS MATURE

From our selection, the Gigabyte P35T-DQ6, the MSI P35 Diamond and the ASUS P5K3 Premium all use DDR3 memory — but the ASUS is different. As ASUS realised there was a shortage of memory modules on the market, and finding DDR3 memory is half the problem with adopting the new standard, they included 2GB of memory with the board. This also allows them to vet the memory for performance on their platform and offer a certain amount of overclocking 'guarantee'. The ASUS P5K3 Premium is sold as being able to reach 1,500MHz frontside bus in 1:1 with the memory (a result easily obtained with the new 1,333MHz FSB Core 2 Duo processors). This is great news, with a little extra speed for 'nothing', but there's a huge gotcha.

ASUS didn't just include modules in a package — the two gigs of DDR3 are firmly and permanently attached to the motherboard. There's no way of removing, replacing or upgrading the memory on this platform, which in our opinion limits its usefulness. There's straight up no way forward for increasing the RAM in the system, so count out that 4GB rig for video editing, running a 64-bit OS (it's possible, but there's no point) or upgrading in the future when it's required. We can completely understand why they did this — it offers an easy way into a DDR3 platform and the 2GB memory quantity is enough, but keeps it from being ridiculously expensive — but why on earth didn't they just do a bundle deal at a lower price and allow people flexibility for the platform?

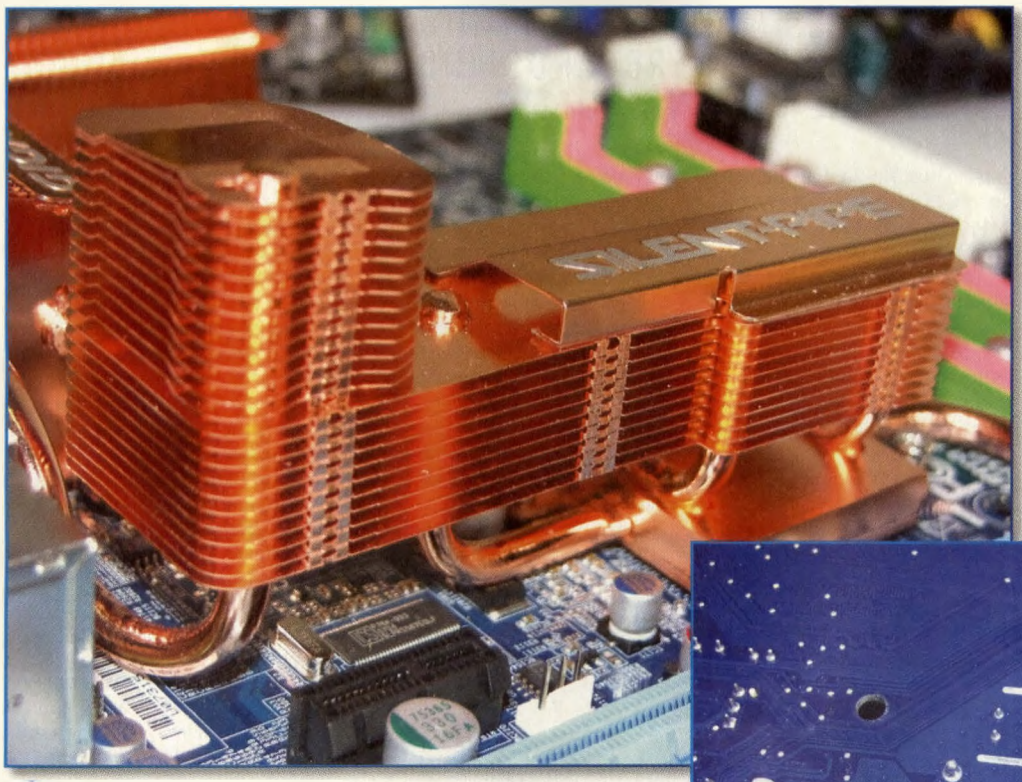
SPEC IT UP

All six motherboards in this challenge were chosen to support the Intel 1,333MHz frontside bus Core 2 Duo and Core 2 Quad processors. As such, they are all socket 775.

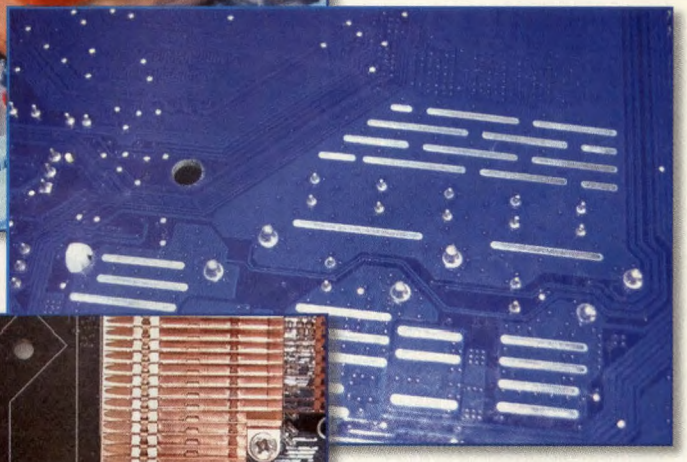
The ASUS P5K3 is a DDR3 motherboard using the Intel P35 chipset. It includes two gigabytes of DDR3 memory attached to the motherboard and no extra RAM slots. It supports CrossFire, with two PCI Express x16 slots, plus three PCI slots and two PCI Express x1s. The P5K3 Premium includes a built-on Wi-Fi module and two Ethernet ports. The backplane includes six USB ports, two eSATA ports, 7.1 surround connections and digital and optical SPDIF. Interestingly, there's a single PS/2 port for a keyboard. There's no FireWire connector on the backplane, but the board does include headers for a connection through a chassis. The Southbridge, ICH9, supports four internal SATA ports, two internal

HOW WE TESTED

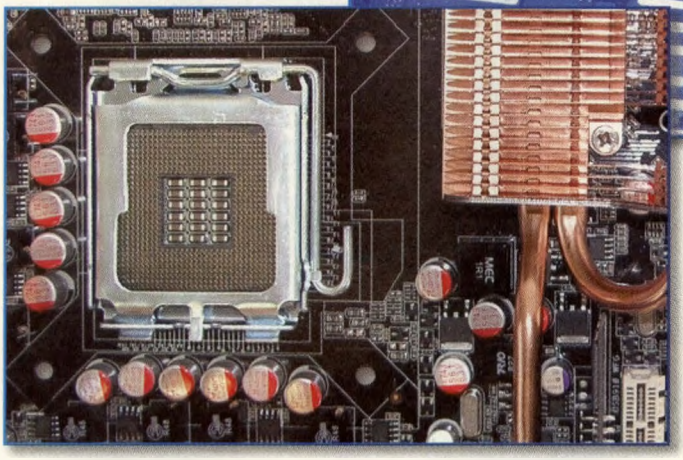
We tested each board with the latest BIOS and drivers available from the vendor's web site. Each board was built around an Intel Core 2 X6850 quad-core processor, 2GB of premium DDR2 or DDR3 RAM from Corsair, an MSI NX8600GTS graphics card and a Western Digital Raptor hard disk drive. Testing was performed under Windows XP SP2 with PCMark05.



Large passive copper systems are more popular than fan driven coolers.



Intel Socket 775 and board tracer routing.



eSATA ports, a floppy connector and an IDE connector for optical drives as well.

Gigabyte's P35T-DQ6 is another Intel P35 board, supporting up to four modules of DDR3. This is a simpler design, with some legacy connectors, which might be handy for some with older hardware. The DQ6 can run ATI cards in CrossFire with two x16 slots, and also includes two PCI slots and three PCI Express x1 ports. The backplane includes four USB ports, FireWire, a single Ethernet port, 7.1 audio out, digital and optical SPDIF, two PS/2 ports and both serial and parallel ports. Internally, the board can run up to eight SATA drives (which can be configured as eSATA), a PATA port for optical storage and a floppy connector.

The simply named P35A from Foxconn is the plain Jane of the bunch, but, that said, has all the connections most people would need. This is another P35-based board, supporting DDR2 and CrossFire with two x16 slots. The P35 sports three PCI slots and a single PCI Express x1 slot. Internally it supports four SATA drives, plus the usual PATA port for optical drives and a floppy connector. The backplane features PS/2 ports, four USB, 7.1 audio, digital SPDIF (but no optical), parallel and serial ports and a single eSATA connector.

EVGA's 680i-based motherboard is a lean and mean overclocking machine. It supports DDR2 memory, Nvidia SLI with two x16 slots, plus a third x16 physical but x8 wired slot for 'physics'. There are two PCI slots and two PCI Express x1s. There are six internal SATA ports, plus PATA and floppy, while the backplane holds a FireWire, PS/2 ports, six USB, two Ethernet optical SPDIF and the 7.1 outputs. There's also a number-based LED-lit problem-solving patch, for when your overclocking isn't going as well as might have been planned.

The Abit IN9 32X-MAX Wi-Fi also uses the Nvidia 680i chipset. This board supports DDR2, Nvidia SLI with two x16 slots, a third slot with x8 bandwidth, two PCI slots and a single PCI x1 port. Internally there are six SATA ports, PATA and floppy, as expected. The backplane holds two PS/2 ports, two Ethernet, four USB, SPDIF, 7.1 and two eSATA ports. Interestingly, there is also a clear CMOS button, which allows you to reset back to basics should there be problems with your overclocking efforts.

Last but certainly not least, the P35 Diamond from MSI has bells and whistles abounding. This is a P35 motherboard supporting DDR3, with two PCI Express x16 slots, supporting CrossFire, two PCI slots (of which one holds the Skype phone should you use it) and two

PCI x1 ports. There's five internal SATA connectors, of which one is eSATA-designated, plus the usual parallel ATA and floppy connectors. The backplane has the chunkiest USB port faceplate we've ever seen, sporting six in total, a single Ethernet port, plus FireWire, SPDIF optical, 7.1 and eSATA. The Diamond has a clear CMOS button internally — which saves hunting around inside a chassis to change jumpers should you be in a non-booting overclock.

CPUs MIGHT BE GETTING COOLER, BUT MOTHERBOARDS AND CHIPSETS ARE GETTING HOTTER

DESIGN AND COOLING

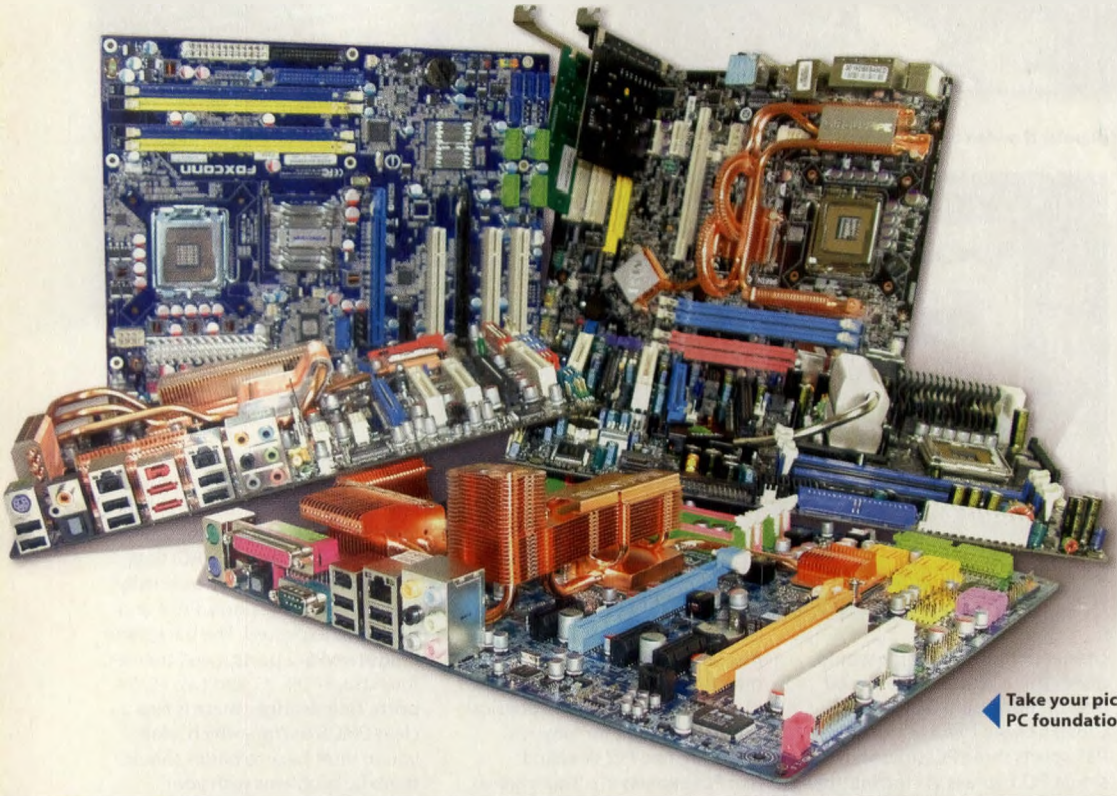
CPUs might be getting cooler, or at least offering more performance for the same heat output, but motherboards and chipsets are getting hotter. It's not uncommon today to see motherboards with large, elaborate cooling systems for the Northbridge and power-regulating hardware, where previously there was just a small fan or plain heat sink. It does stand to reason, as the motherboards run faster and faster, to keep up with the increase in CPU speeds.

The two 680i boards from EVGA and Abit are of the 'less is more' design school. As the 680i chipset runs cooler than the P35, the thermal solutions on the boards are minimal. The P35A motherboard from Foxconn was the only board with a passive solution. The relatively old-school passive heat sink on the Northbridge makes us a little worried, more than relieved. Though we experienced no heat problems running the P35A near stock speeds, you might consider an aftermarket cooler if you plan on doing heavy overclocking or if the PC is going to be placed in a very warm area of the house (or office).

MSI, Gigabyte and ASUS all include very elaborate systems of heat pipes and copper radiators to keep the temperature of the chipsets and power regulators down. Theoretically, this extends the life of the board (especially when overclocking heavily) and does away with the need for running a fan for the Northbridge cooler — the CPU cooler fan does the work for it.

The heat pipes and cooling systems are all laid out rationally, and none interfere with the attachment of the largest CPU cooler we had in the Labs. The Gigabyte did have the tightest fit, but there was still an amount of wiggle room.

The layout of the boards in general was all quite rational and acceptable. No standouts for design faux pas, with plenty of clearance behind PCI Express slots for longer or wider video cards — room to get memory modules in and out without breaking your fingers. The MSI P35 Diamond is one we looked at askance. The two PCI Express x1 slots on the board are situated between the two x16 slots. It might be a reasonably rare case, but running a CrossFire system on this board may mean you have to go without the use of any of the x1 slots for other expansion cards. The Foxconn board suffered with the same problem, with the only x1 slot covered up when two graphics cards are installed. All other boards provided an x1 slot 'behind' the main graphics x16 slot, which would allow an expansion card to be fitted in either case.

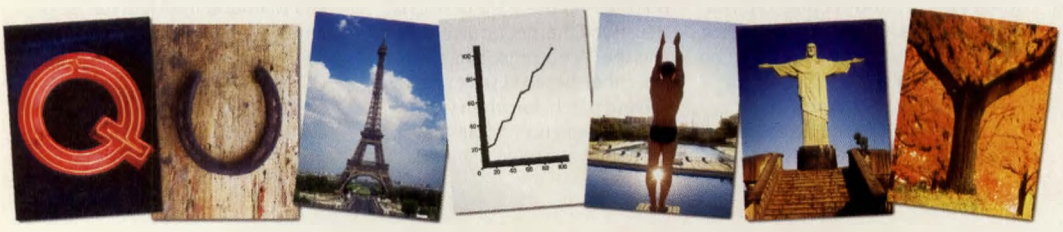


Take your pick from this selection for a solid PC foundation.

EXTRAS, EXTRAS, READ ALL ABOUT IT!

A premium product wouldn't be premium in this industry unless it offered functionality above and beyond the usual. It's no good just being faster; they have to do more as well. These boards represent a mix of extras, which may suit your needs, or not.

The MSI P35 Diamond, the Abit IN9 32X-MAX Wi-Fi and the ASUS P5K3 Premium are all jam-packed with bits and bobs. The ASUS includes a built in Wi-Fi module (with software AP), supporting



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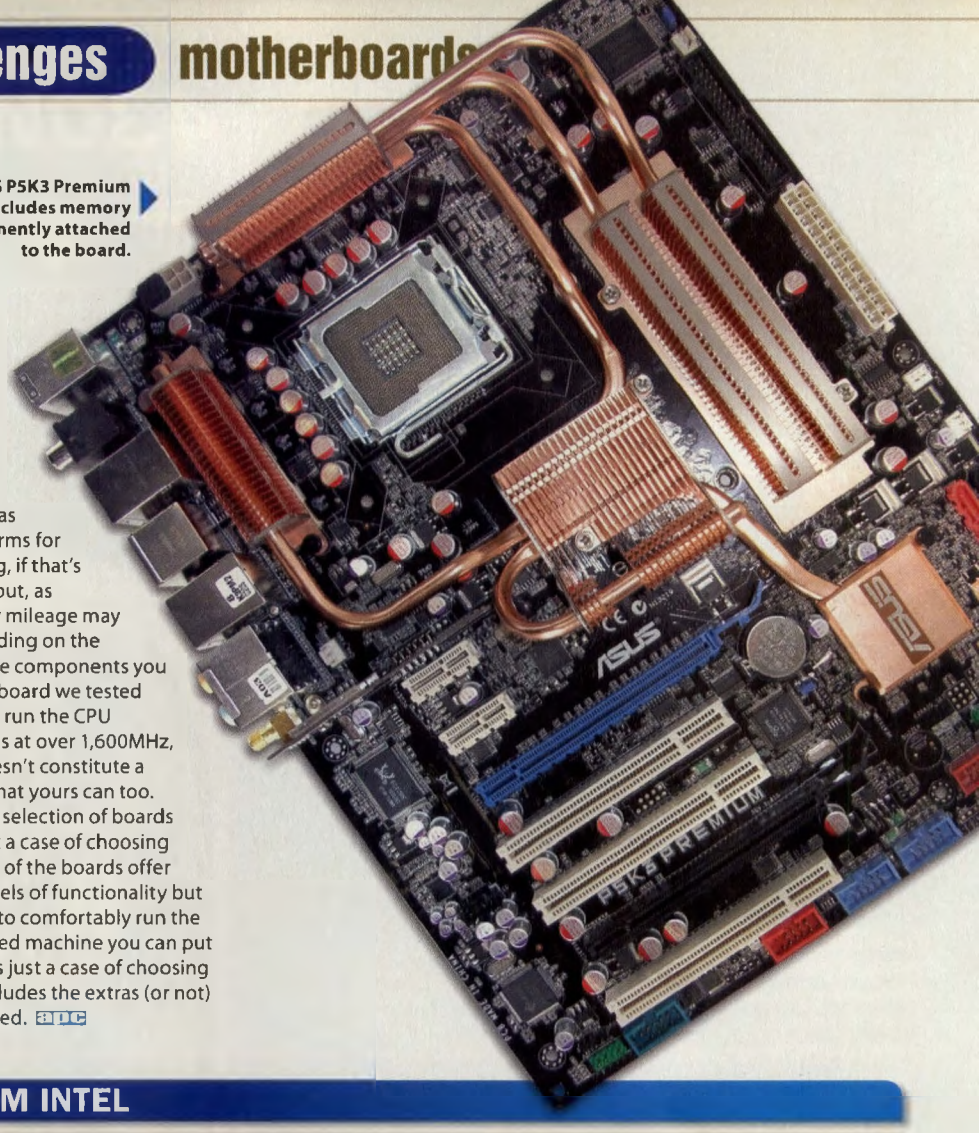
Seasonic Since 1975

802.11b/g, the indispensable Q-connector kit (which allows out-of-chassis setup of those fiddly, annoying computer case wires) and the biggest inclusion, 2GB of RAM. The Abit IN9 32X-MAX Wi-Fi bundles up an 802.11b/g Wi-Fi with software AP, the usual complement of cables, while the MSI P35 Diamond really shines. In the box, this bundle includes the board, a Sound Blaster X-Fi Xtreme Audio breakout card and a Skype-compatible VoIP card — letting you use a real phone when Skyping away to your friends. It offers a POTS passthrough as well. The boards from EVGA, Foxconn and Gigabyte are a tad more reserved. None include Wi-Fi modules or premium audio solutions. Of course, this keeps the price down, and lets you choose your own, if that's what you require.



ASUS P5K3 Premium includes memory permanently attached to the board.

ON THE BENCH

As with most motherboard tests, similarly outfitted motherboards performed very closely. The DDR2 motherboards clustered at just under 8,000 points, while the DDR3 solutions finally get a boost up into the 8,000 space. Both the 680i and the P35 boards have proven themselves as good platforms for overclocking, if that's your thing, but, as always, your mileage may vary, depending on the quality of the components you have. Every board we tested managed to run the CPU frontside bus at over 1,600MHz, but that doesn't constitute a guarantee that yours can too.

With the selection of boards here, it's not a case of choosing a winner. All of the boards offer different levels of functionality but will be able to comfortably run the highest-speed machine you can put together. It's just a case of choosing one that includes the extras (or not) that's required.

NEW CPUs FROM INTEL

Exactly one year ago, Intel's 65nm dual-core processors steamed ahead of anything we had previously seen. Then Intel kicked AMD while it was down with the first quad-core processor. Now Intel is updating its lineup once again while we're yet to see anything concrete from AMD.

The three new processors are a small step rather than a giant leap forward. The chips now support a 1,333MHz FSB, in conjunction with the Bearlake chipset and DDR3 memory, offering small improvements over the last generation, rather than revolutionary new designs. The model numbers reflect this: E6750, E6850 and QX6850, without changes to clock frequency or number of cores.

THE NEW BREED?

That's not to say these new chips aren't performance beasts. The quad-core QX6850 is one of the most powerful desktop CPUs we've ever seen. The E6750 isn't such a monster but is still extremely fast. The extra bandwidth that comes with a 1,333MHz FSB reduces bottlenecks and squeezes even more out of the processor. But under the hood these are last year's CPUs given a little oiling. Clock speeds are virtually identical, TDP is the same 65W and the transistor size is still 65nm.

Our performance tests confirm this — Super PI and Cinebench scores are only marginally better. The QX6850 took slightly longer to calculate 32 million decimal places of Pi than the QX6800. This is despite the faster FSB, new chipset and DDR3 memory in our test platform.

One of the big selling points of the original Core 2 Duo line up was the fantastic opportunity for overclocking: the cheapest models could be pushed beyond 3GHz with stock cooling. The new lineup continues this tradition: the E6850 is capable of 4.0GHz with a voltage change and stock cooling. Reports from the web are that users with access to exotic cooling systems such as liquid nitrogen have pushed the chip to 5.13GHz. Unbelievable.

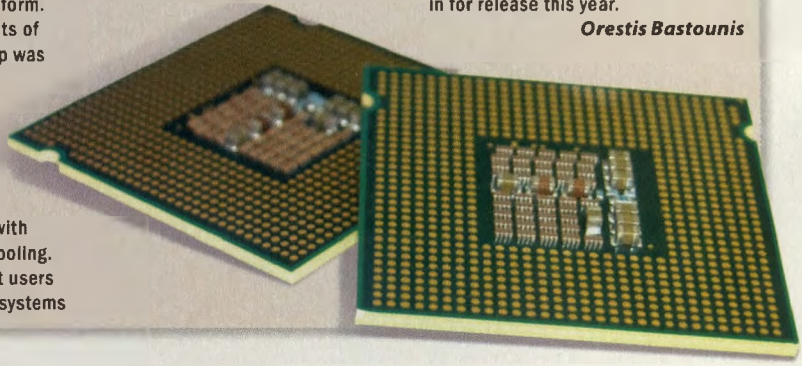
CHEAPEST CHIPS

However, the real innovation with these chips is the new pricing. Thanks to a tweaked manufacturing process, they are all cheaper than the older Core 2 Duos. We expect the older 1,066MHz FSB models to get even cheaper as they're phased out.

Intel is now forcing AMD to fight a war on two fronts — performance and price. Nothing in AMD's current line-up competes with Intel's top end. A lot rests on AMD's quad-core recapturing the performance crown, and even if it manages that, AMD can't charge the earth for it.

We admit to being disappointed with this refresh to Intel's desktop lineup though. We're still waiting for Intel to release the 45nm Penryn processors, with two models codenamed Wolfdale and Yorkfield. These will offer 6MB of L2 cache for the dual-core model and 12MB of cache for the quad-core, and will also see the debut of the SSE4 instruction set. These are pencilled in for release this year.

Orestis Bastounis



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Anatomy of a motherboard

A motherboard is a complex thing — we outline the main components of a board (and what they're for).

1 CPU Socket — For Intel CPUs, 775 sprung pins to meet connectors on the base of the CPU. Holds the chip down firmly with a lever.

2 Backplane — Holds connectivity ports for the rear of your case. Includes USB, Ethernet, FireWire, audio ports and sometimes serial and parallel ports.

3 RAM Slots — For DDR2 memory, 240 pins, capable of up to 20GB/s bandwidth. DDR3 memory up to 12.8GB/s (but on the way up).

4 Northbridge — On Intel platforms includes the memory controller. Determines the speed and type of CPU and RAM that can be fitted on the board.

5 PCI Express x16 — Suitable for graphics cards, x16 slots run at a bandwidth of 4GB/s. Depending on the chipset, x16 slots may only offer x4 bandwidth (1GB/s).

6 PCI Express x1 — Used for add-on cards, such as TV tuners and Wi-Fi, offers 250MB/s bandwidth.

7 PCI Slot — For add-on cards — sound, TV tuners, Wi-Fi and storage controllers, offers 266MB/s bandwidth.

8 Southbridge — Looks after the disk-based storage, including SATA/PATA, plus Ethernet and more.

9 Capacitors — Help regulate power on the motherboard. Most designs now use solid caps that last longer.

10 Internal USB — For connecting USB ports on the front of a PC case.

11 SATA Ports — For SATA and SATA II hard disk drives. One drive per port only.

12 CMOS Battery — Holds system and BIOS settings even when the PC is powered down.

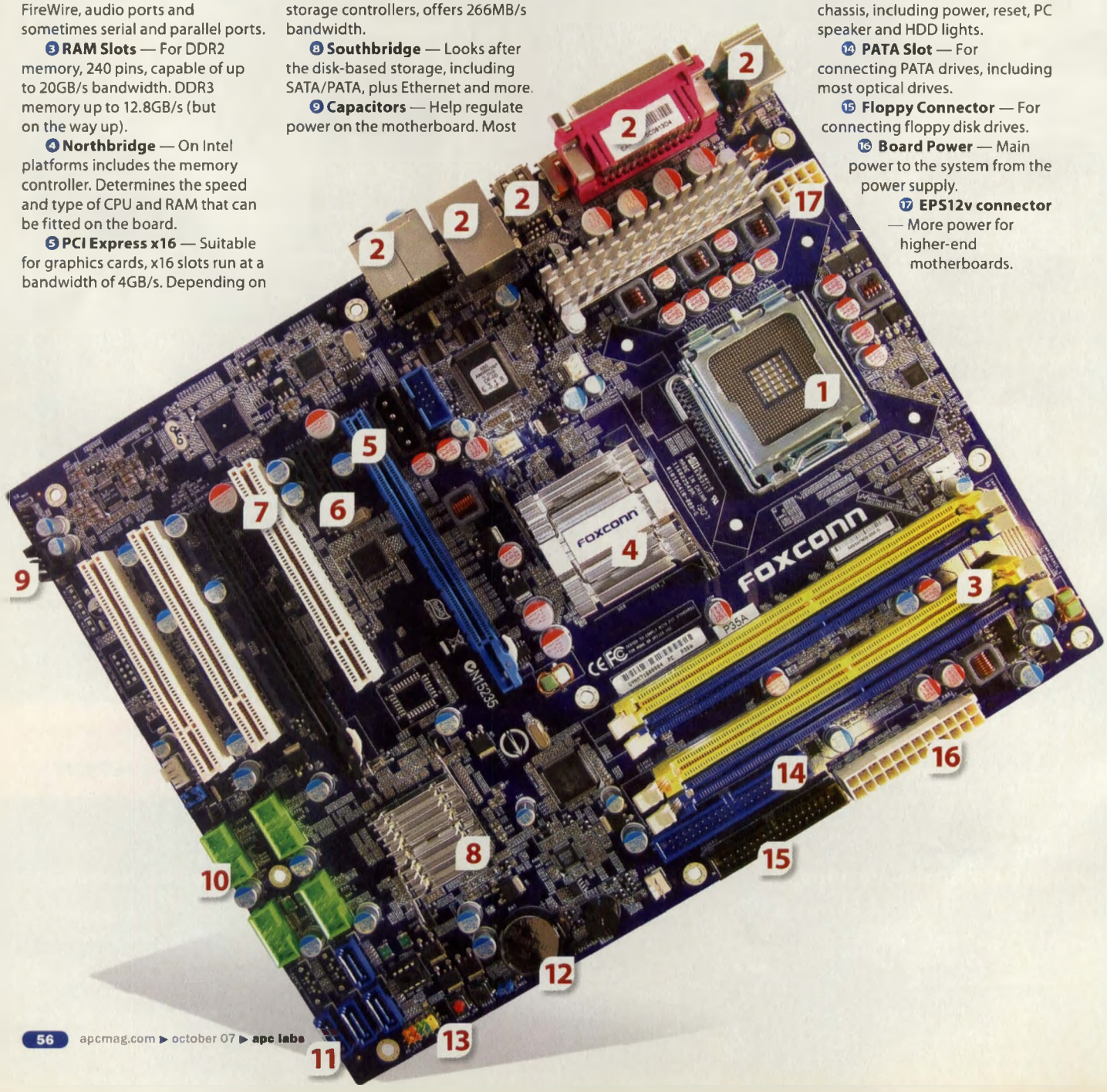
13 Case Connectors — Cable connectors for integrating into a PC chassis, including power, reset, PC speaker and HDD lights.

14 PATA Slot — For connecting PATA drives, including most optical drives.

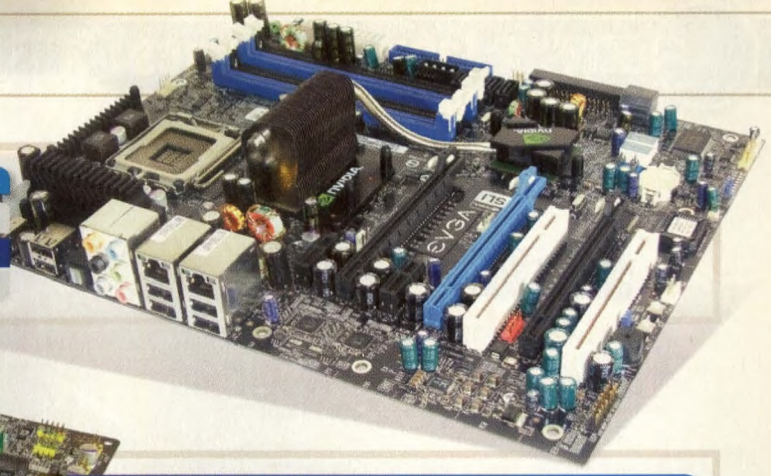
15 Floppy Connector — For connecting floppy disk drives.

16 Board Power — Main power to the system from the power supply.

17 EPS12v connector — More power for higher-end motherboards.



1 EVGA 680i



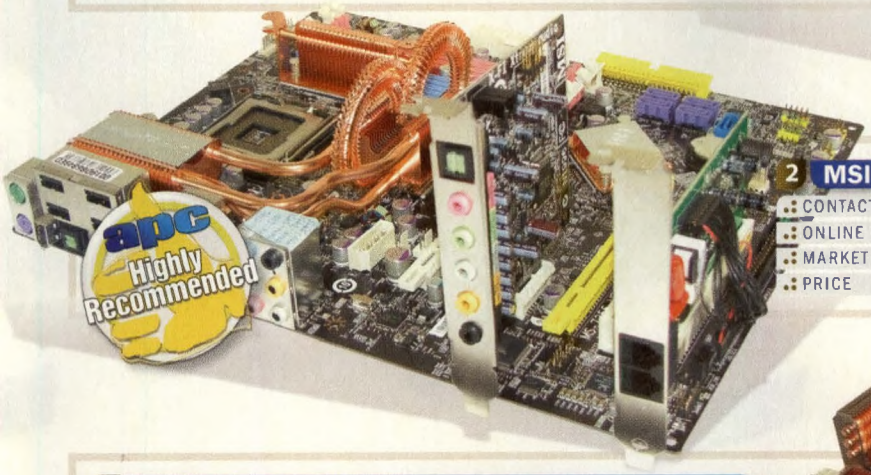
- CONTACT: Shadow Entertainment
- ONLINE: shadowentertainment.com.au
- MARKET: Everyone
- PRICE: $345

✔ Proven platform, layout and design.

VERDICT ★★★☆☆

✖ Needs a solid case cooling system.

2 MSI P35 DIAMOND



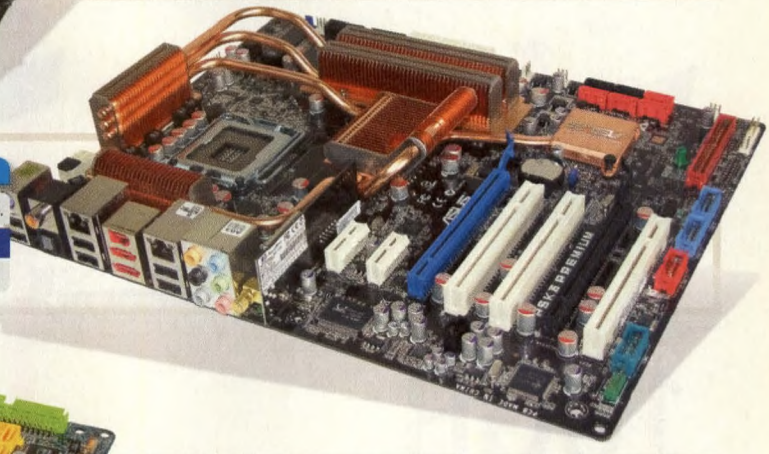
- CONTACT: MSI
- ONLINE: www.msicomputer.com.au
- MARKET: Everyone
- PRICE: $399

✔ Great audio, with dedicated card.

VERDICT ★★★★☆

✖ Little room for expansion cards.

3 ASUS P5K3 PREMIUM



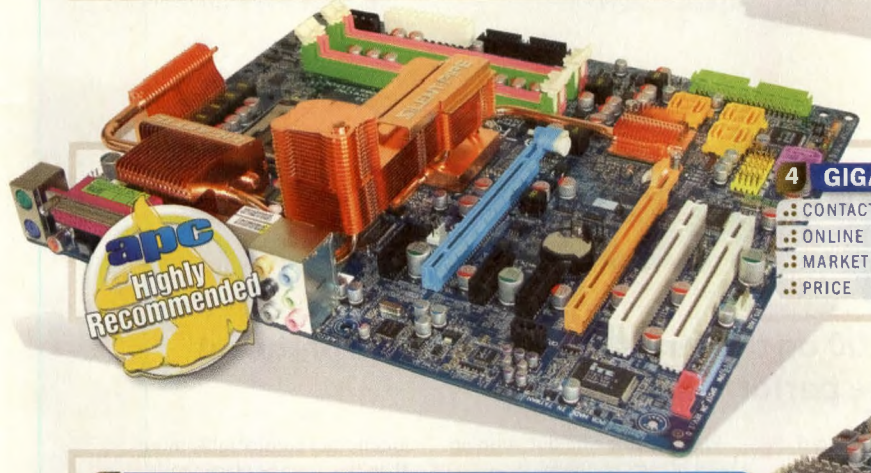
- CONTACT: ASUS
- ONLINE: www.asus.com.au
- MARKET: Everyone
- PRICE: $1,599

✔ Guaranteed to overclock to 1,500MHz.

VERDICT ★★★½☆

✖ No RAM upgrade path; expensive!

4 GIGABYTE P35T-DQ6



- CONTACT: Gigabyte
- ONLINE: www.gigabyte.com.au
- MARKET: Everyone
- PRICE: $439

✔ Solid, performing design.

VERDICT ★★★★☆

✖ None of the glitz.

5 FOXCONN P35A

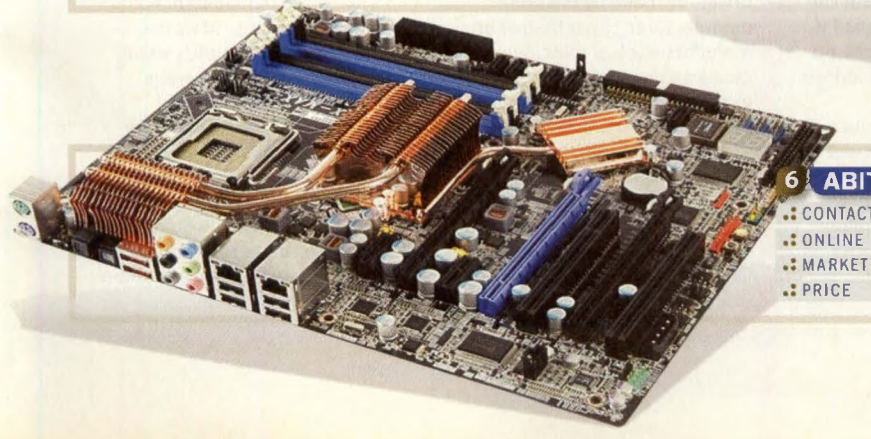
- CONTACT: Bluechip IT
- ONLINE: www.bluechipit.com
- MARKET: Everyone
- PRICE: $328.90

✔ Simple cooling system; nice price.

VERDICT ★★★☆☆

✖ Not the best-designed board.

6 ABIT IN9 32X-MAX WI-FI



- CONTACT: Altech
- ONLINE: www.altech.com.au
- MARKET: Everyone
- PRICE: $449

✔ 680i with a load of extras.

VERDICT ★★★☆☆

✖ It's expensive.

1 ADATA MY FLASH DRIVE

- CONTACT Adata
- ONLINE www.anyware.com.au
- MARKET Everyone
- PRICE $229

✔ Fastest read speed.

VERDICT ★★★☆☆

✖ Writes at less than 25% read speed.

2 SHINTARO POCKETDISK

- CONTACT Shintaro
- ONLINE www.mmt.com.au
- MARKET Everyone
- PRICE $279

✔ Very fast read speed.

VERDICT ★★☆☆☆

✖ High seek latency; poor write speed.

16GB memory keys

16GB memory keys for less than $200 on the street? We'll have one of those! *Dan Warne* puts them through some performance testing.

The opportunities that 16GB memory keys present are incredible: the capacity is easily big enough for a Linux Live-USB installation along with a big chunk of your documents and music — as long as you have a PC with USB 2.0 at work (and which can boot from USB), you could have a portable PC.

You could also fit a full installation of Vista or XP on one... though it's only useful as a backup boot disk for your main PC, since Windows can't reconfigure for different hardware on the fly.

We were also hoping that the keys could be used for Windows Vista ReadyBoost, to provide a massive, high-speed, virtual memory store, but we discovered that Microsoft has capped ReadyBoost to 4GB maximum.

However, in terms of sheer data cartage, a 16GB memory key is a fantastic asset: it could store all the installation ISOs a system administrator would need, it can store two to three series of a TV show, over 20 DivX-compressed movies... we could go on forever.

But are these bargain basement memory keys much chop when it comes to speed? Have the manufacturers simply pumped them full of the poorest quality flash and dumped them onto the market — or do they offer decent performance?

We set out to find out, running a bevy of tests on them.

PHYSICAL FORM FACTOR

First up, observations about the physical form factor of the drives: clearly, the Shintaro and the Adata drives are made by the same manufacturer. Either that, or one manufacturer has coincidentally created a product that looks exactly the same as the other manufacturer's product. They come in a traditional compact memory key size, with a clear perspex casing and inner silver case.

The Flash Voyager is encased in a resilient rubber that feels like it would protect the drive's electronics considerably more than the average plastic casing. We didn't have permission from the manufacturer to run over it with a wheelbarrow full of bricks, unfortunately, so we can't prove it, but it certainly feels sturdy.

The Transcend JetFlash is exceptional because of its size — and not in a good way. It's about twice as large as your average memory key and has an odd 'bulging' form factor. Still, larger size can be a virtue if you're someone who easily loses things.

All the drives had slide-off USB connector covers that would be easy to lose, unlike some of the nifty (but more expensive) designs

3 CORSAIR FLASH VOYAGER II

CONTACT	Corsair
ONLINE	www.altech.com.au
MARKET	Everyone
PRICE	$269

✔ Good size and rubber casing.

VERDICT ★★★★☆

✖ A fair way off the fastest write speed.

4 TRANSCEND JETFLASH 2A

CONTACT	Transcend
ONLINE	www.cellnet.com.au
MARKET	Everyone
PRICE	$399

✔ Fastest write and OK read speed.

VERDICT ★★★★☆

✖ Expensive; large physical size.

HOW WE TESTED

We used the disk benchmarking software HDTach 3.0.1.0 on a new HP Compaq vPro PC. The system Southbridge (which controls disk and USB functions) was an Intel ICH8. All tests were conducted under Windows XP SP 2, and we compared the results we achieved with previous tests conducted on hard drives with HDTach to provide a baseline for comparison.

from Sony and SanDisk, with the USB connector on a slide-out rail.

PERFORMANCE

We looked at three areas of performance in the flash disks: read speed, write speed and random access seek speed.

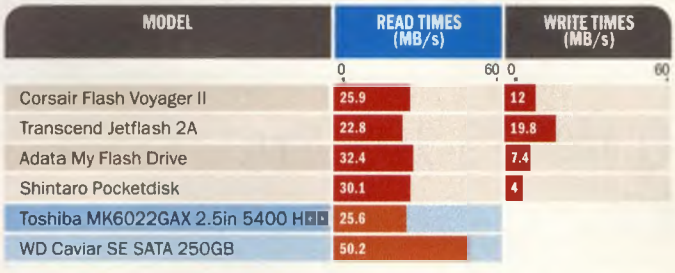
The winner in read speed was the Adata disk, at 32.4MB/s — faster than a Toshiba 5,400rpm laptop hard disk connected via PATA. But its write speed was third-slowest at 7.4MB/s.

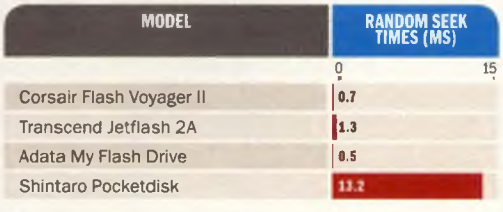
The winner in terms of write speed was the Transcend JetFlash drive at 19.8MB/s, but its read speed was the slowest at 22.8MB/s.

Although we're not experts on the intricacies of flash silicon, there seems to be a strong correlation between good write speeds and poor read speeds, and vice versa.

However, for our money, we'd be buying the Transcend JetFlash disk — 22.8MB/s may be the slowest read speed, but it's still only 30% slower than the fastest drive. However, the write speed of 19.8% is 80% faster than the slowest drive. Since your data has to get onto the memory key at some point, and the ongoing usefulness of the 16GB capacity will require many instances of copying files to the disk, rather than just reading from it, write speed is a very important factor.

One anomalous result we saw was the seek speed of the Shintaro disk. Seek speed (the time it takes for a drive to locate the data on a disk and start feeding it back to the PC) on a flash memory drive should be nearly instantaneous, since there are no moving parts. However, in the case of the Shintaro, the repeatable result was a seek time of 13.2ms, which probably wouldn't affect large file transfers too much, but would definitely slow performance if you were running an OS from it or accessing many small files like emails. apc





Clearly, the Shintaro is the odd one out in seek times, but repeated testing gave the same result, so we were satisfied that it was not an error.

IN TERMS OF SHEER DATA CARTAGE, A 16GB MEMORY KEY IS A FANTASTIC ASSET

QNAP TS-109 Pro

There are plenty of external drive enclosures on the market which will give you basic, no-fuss NAS functionality, but when you want a unit that's really going to pull its weight, you need something with a bit more grunt.

The TS-109 Pro by QNAP Systems is a powerful NAS unit, suitable for SOHO and power users. It supports SATA/SATA 2 hard drives up to 1TB in size, but doesn't come with any drives pre-installed. We tested the unit with a WD 80GB SATA drive.

The TS-109 Pro features a powerful back-end software bundle, driven by a 500MHz Marvell 5182 CPU and 128MB DDR2 RAM. It has 3 x USB2.0, 1 x eSATA and 10/100/1000 Ethernet ports and supports USB sticks, cameras, hubs, printers and card readers.

The underlying software bundle on the unit is very impressive. The TS-109 Pro can act as a cross-platform file, FTP and print server, and can also integrate with Windows Active Directory for user authentication and NTFS file permissions. It can also be set up as a simple web server with MYSQL/SQLite/PHP functionality as well as Dynamic DNS. On the multimedia front, it can act as an iTunes server and also comes with TwonkyMedia for UPnP media streaming as well as internet radio. Using Q-RAID-1 it can mirror itself to an external USB/eSATA drive or replicate with other QNAP products on a remote network.

Disk performance is outstanding – it took just five minutes to copy 2.8GB of assorted MP3s and ebooks to the unit and five minutes to copy it back, and that wasn't even using a particularly fast hard drive.

This unit will do everything you want and more, but its hefty price tag will discourage all but the most demanding users.

CONTACT	Bluechip IT
ONLINE	www.bluechipit.com.au
MARKET	Everyone
PRICE	$499

✔ Wide feature set; very powerful.

VERDICT ★★★★½

✖ Expensive.

The best network storage

Can anything stop the rise and rise of Network Attached Storage? *James de Ville* investigates.

As anyone who has ever installed slackware on a decrepit IBM-compatible and hidden it under the stairs will tell you, attempting to run a simple file server has previously been far from a straightforward exercise. External storage exploded in popularity a few years ago; desktop drives housed in attractive boxes allowed notebook users to expand their film collections and provided desktop users with a fast way to transfer large files between computers. With the simultaneous rise of the wireless home network and an increase in the average number of computers in each household, the natural progression had to be to unite the two products.

Enter Network Attached Storage, an advancement that took the idea of a Linux-based server and really did nothing more than squeeze it into a small form factor. The first commercial units appeared with the initial Wi-Fi boom, sporting integrated wireless adaptors. It soon became clear that, whilst this concept was commendable, an 802.11b/g network's speed and range simply wasn't up to the task of providing exclusive access to important files. The point of such a drive was negated further by its inevitable location next to a wireless router, which was fully capable of sharing the drive's contents itself. Needless to say, wireless NAS has now all but totally disappeared, though it did whet the public's appetite for network storage, paving the way for the Ethernet invasion.

ANATOMY 101

Internally, a NAS device shares its vital organs with a computer, sporting a motherboard, processor and RAM, it differs only in its 'headless' design. The average NAS specification is similar to that of a PocketPC, with a 2,400MHz Freescale or ARM processor and a paltry 32-64MB of RAM. This may sound horrifically slow next to a Quad Xeon behemoth, but within a home or small office, it's surprisingly capable. A network device requires a considerably more complex operating system than a USB or FireWire enclosure in order to reliably administer itself as a file server; most consumer network storage uses an embedded Linux kernel running Samba or NFS.

Western Digital My Book World Edition

Network Attached Storage (NAS) units are increasingly popular in the home as people look for a way to centralise their data without building dedicated storage machines. Western Digital's My Book World Edition offers networked storage to a single 500GB hard drive via a 10/100/1000 Ethernet port. The unit is quite small and unobtrusive, with a white, rounded Mac-like case. The front panel has two LED surrounding the power button, which give readouts of device activity and remaining storage capacity.

The My Book ships with an application called "WD Anywhere Access", which is a Western Digital-customised version of MioNet remote access software. This allows users to register the My Book on MioNet and access it from remote networks – the software is licensed for five machines and is incompatible with any existing installs of MioNet. The application CD also contains EMC Retrospective Backup software to facilitate automated data backups.

The device performance was rather average. It took 12 minutes to copy 2.8GB of assorted MP3s and ebooks to the unit and seven minutes to copy back the same data. There are certainly faster devices out there.

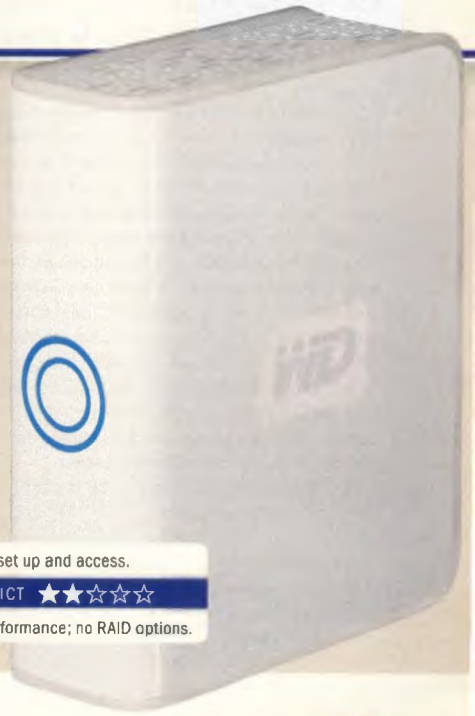
WD attempts to promote only accessing the unit via the Anywhere Access software, but the unit functions fine with nothing installed. It appears on the network as an unsecured CIF share (\\ipaddress\public), but you can use the web interface to add users and secure shares. There is also a USB port on the back to attach extra USB storage devices, but you have to set up a new share to access it. Disappointingly, this device doesn't have many popular NAS features, like a media or print server. Additionally, although it functions fine as a NAS device, both the disk and management performance are nothing to get excited about.

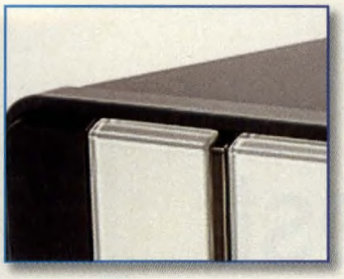
CONTACT	Western Digital
ONLINE	www.westerndigital.com
MARKET	Everyone
PRICE	$399

✔ Easy to set up and access.

VERDICT ★★☆☆☆

✖ Poor performance; no RAID options.





> MANUFACTURERS ARE ENTIRELY AWARE THAT A CENTRAL, NETWORKED LOCATION IS THE IDEAL HOST FOR YOUR MEDIA

The majority of NAS enclosures feature at least one USB host socket — this can often be used to share a printer between network users, and most will accept a USB flash drive or hard disk, though NTFS support is limited to read-only on many devices due to Microsoft's licensing requirements. As a NAS device is a host in itself, it can't be natively connected to a PC via USB, FireWire or eSATA; in the same way that connecting a USB cable to the back of another PC won't give you free reign over its files, a NAS won't provide direct access to its internal disk. Rather, it provides permission-based access to defined shared folders.

This provides the same flexibility in security and permissions as a Linux server: one folder can be set to provide read/write access to anyone on the network, another could offer read-only access via FTP and a third could be inaccessible to all but the folder's owner. Security can be strengthened further on multi-drive devices by using RAID 1 or 5, though you'll lose up to half your storage space. The reassurance that your files are protected from drive failure is worthwhile for anyone seeking a NAS as a backup device.

BEYOND STORAGE

The majority of NAS devices currently on the market now transcend their definition to provide support for a range of sharing and streaming protocols. We'd wager that, for many home users, the primary temptation of Network Storage will be the amount of digital backups of legally purchased CDs and DVDs they'll be able to store. Manufacturers are entirely aware that a central, networked location is the ideal host for such a collection, and it hasn't been difficult to add support for protocols such as UPnP AV and iTunes Server. The former provides a direct, uncomplicated link with an increasing number of hardware UPnP clients available (eg. MS's Xbox 360 and Netgear's EVA700 and 8000 will all stream audio and video to an HDTV directly from any UPnP-enabled NAS).

The value of NAS when connected to the internet hasn't been overlooked, either. FTP server capability is common, offering users access to their files from anywhere: invaluable if you've left an important document at home or have a sudden urge to listen to an obscure track from your collection. Less common but arguably more useful for home users is the ability

Linksys Network Storage Link for USB 2.0 Disk Drives

Providing a network bridge between an external disk and a home network is a welcome idea, offering anyone who has already invested in one or more USB storage devices a way to network their files. Plug Linksys' Storage Link into your Ethernet network and it will allow you to easily add storage from USB 2.0 network drives. It's attractive, small, ergonomic and easily concealable. But, fundamentally, the device is badly conceived. A connected drive must be formatted to the Linux EXT2/3 format before use, resulting in the drive's total incompatibility with a Windows PC. Drives also aren't hot-swappable, going against the very nature of the USB specification, and there's no support for networking a USB printer. The final blow is the Storage Link's lack of a Gigabit Ethernet connection. As a result, copying 1GB in our tests took over five minutes.

CONTACT	Linksys
ONLINE	www-au.linksys.com
MARKET	Everyone
PRICE	$150

✔ Small; easily portable.

VERDICT ★☆☆☆☆

✖ Not Windows-compatable.

Iomega Storcenter 500GB Gigabit Ethernet

The Storcenter is beautifully compact, enclosing its two 250GB drives in a simple, understated solid metal body. There's support for Gigabit Ethernet, RAID 1 and 0 and UPnP for media streaming, as well as two USB sockets for networking a printer. Disk noise during read/write operations is reasonably high due to the sound resounding through the metal body, but is really only noticeable due to the internal fan's silence. There's no web interface, so before the drive can be used, Iomega's discovery software needs to be installed on one computer. It's one of the simplest configuration programs we've seen, requiring a single click to locate the disk and map it as a drive in My Computer. 1GB of data took two and a half minutes to copy due to the fast Gigabit connection, and streaming hi-def video (via a UPnP media streamer) ran over Ethernet.

CONTACT	Iomega
ONLINE	www.iomega.com.au
MARKET	Everyone
PRICE	$849

✔ Compact; easy configuration.

VERDICT ★★★★☆

✖ Some noticeable disk noise.

to download files via HTTP, FTP or even BitTorrent; being able to start a large file downloading in the evening and then shut down our PCs will undoubtedly save money on electricity bills.

A Linux-based device's destiny is to be augmented by a user base, and open source firmware has given rise to a number of useful modifications for many of the most popular network storage devices. It hasn't been hard for users to install Apache, PHP and MySQL in order to host entire web sites from their drives, for example. One of the most successful devices in this field has been Synology's DiskStation, the modification of which is actively encouraged through the manufacturers' own forums. Among one of the most successful additions is SSODS, or SlimServer On DiskStation, a server process for Slim Devices' SqueezeBox media streamer compiled to run on the DiskStation's kernel device.

The price of storage is dropping all the time, and with the recent launch of 750GB consumer drives, NAS's scope within the home or small office goes from strength to strength. There are all kinds of predictions we could make regarding its future; whether, for example, the decrease in size of flash-based hard drives in notebooks will be the defining event to really propel NAS into every home, or whether the ratification of Wireless-N will see a mass re-attempt at building a device that can be locked away securely, yet still provide a reliable, high speed connection. For the moment, at least, we remain eagerly speculative. apc

The TeraStation has four switchable drives for expansion possibilities.

D-Link DNS-323 2-Bay Network Storage Enclosure

The case feels a bit cheap, but, once installed, the drives are secure and protected. The twin-bay setup allows two 750GB hard drives to be installed for 1.5GB in RAID 0 or 750GB of entirely secure RAID 1 data storage. The Linux installation can operate an FTP, iTunes and UPnP server, and provides print server support via a single USB socket – but this can't be used to connect a mass storage device.

Software is optional, as the drive assigns itself a default IP address. Connecting to the router reveals an attractive web interface, providing control of the drive's settings. The D-Link is impressive, but the price is pretty steep for an empty enclosure.

CONTACT	D-Link
ONLINE	www.dlink.com.au
MARKET	Everyone
PRICE	$399

✔ RAID storage; FTP; iTunes or UPnP.

VERDICT ★★★☆☆

✖ Price for an enclosure.

Buffalo TeraStation Pro II 2TB

apc Highly Recommended

Despite being enormous in scope, size and storage, with all four disks spinning this is almost silent in operation. It's aimed at business users, though home office workers will like the security: RAID modes 0, 1 and 5 are supported. By default, it's configured for the latter, providing fault tolerance (a single drive fail won't result in data loss) and a fast write speed; our gigabyte test file transferred in under 90 seconds. It has confusing and sadly obligatory software, which once installed insists on popping up to relocate and connect to the drive each time Windows is loaded. The TeraStation can be expanded via USB but lacks a print server. As a dependable and fast server for a small or home office, it doesn't get better than this.

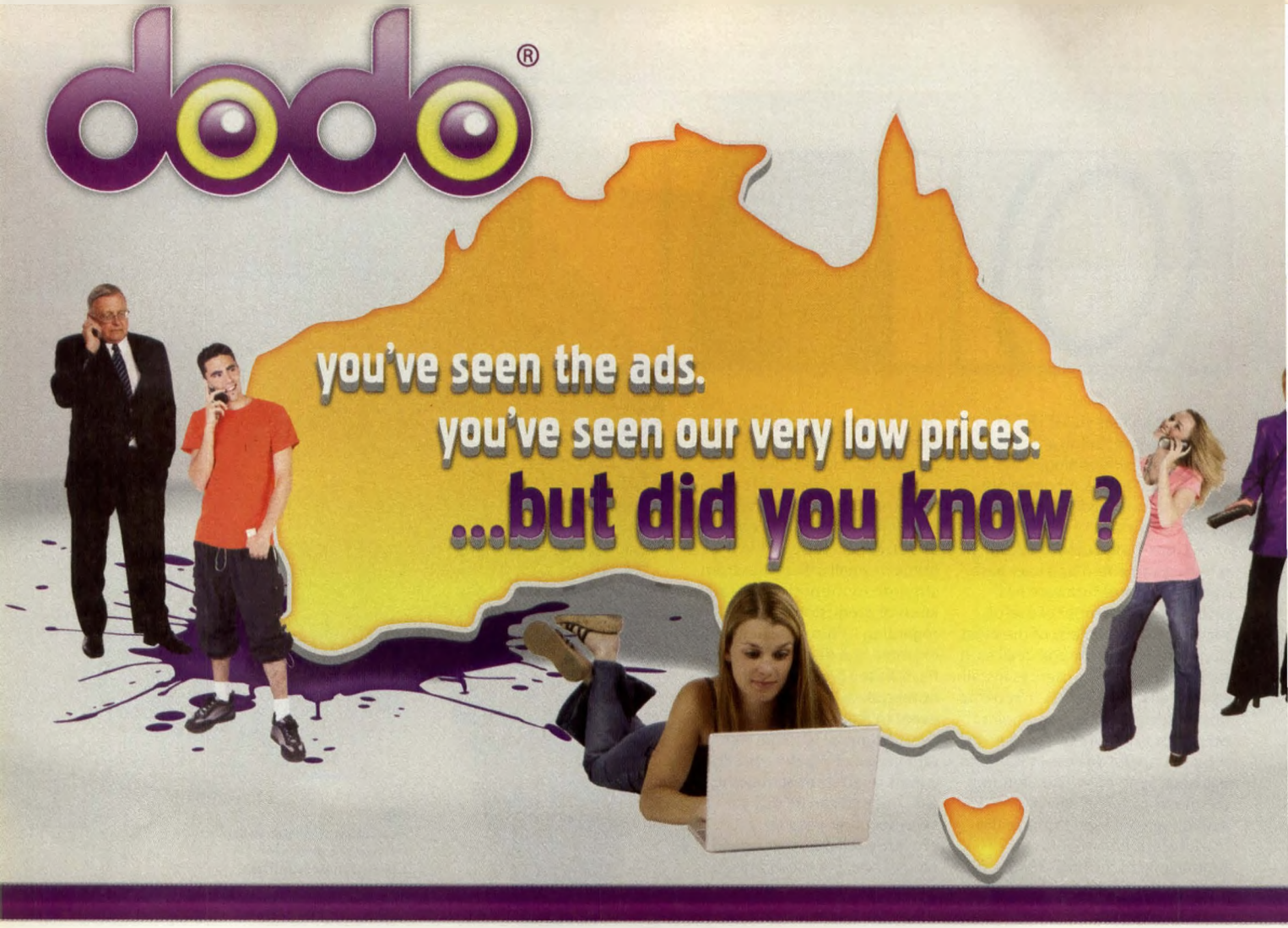
CONTACT	Buffalo
ONLINE	www.buffalotech.com
MARKET	Performance enthusiasts
PRICE	$1,199

✔ Silent; powerful.

VERDICT ★★★★☆

✖ Confusing software.

dodo®



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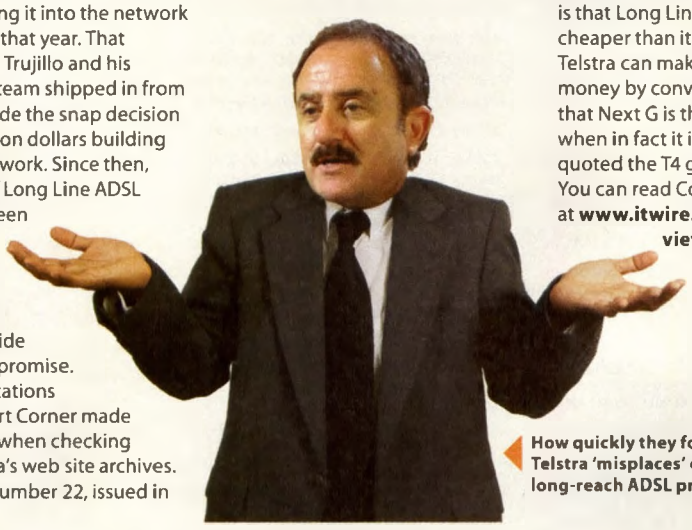
Telstra deletes promise of long-reach ADSL

Whatever happened to Telstra's claim that it would be able to deliver ADSL over lines as long as 20km from the exchange?

Back in *APC* February 2005, we reported on Telstra's 'Project New Ground', which would use hardware from a Melbourne company called Extel to extend the reach of ADSL to people up to 20km from an exchange. The hardware was successful in field tests and Telstra announced that it planned to start installing it into the network by September that year. That was before Sol Trujillo and his management team shipped in from the US and made the snap decision to spend a billion dollars building the Next G network. Since then, the promise of Long Line ADSL has not only been forgotten, but the telco's spin doctors appear to have tried to hide records of the promise. Telecommunications journalist Stuart Corner made the discovery, when checking through Telstra's web site archives. Press release number 22, issued in late January 2005, is missing from Telstra's web site (though 21 and 23, and the rest of the press releases, are all still available for viewing). Corner had preserved a copy of the press release on his own computer, and, upon checking it, discovered it was one announcing that Telstra had successfully completed a trial of the long-reach ADSL technology. The T4 group of carriers, which includes AAPT, Austar, iiNet, Internode, Macquarie Telecom, Powertel, Primus Telecom, Telarus, TransACT, WestNet and Unwired, told Corner that it believed there was a simple reason for the deletion. "The problem for Telstra is that Long Line ADSL is much cheaper than its Next G network. Telstra can make much more money by convincing customers that Next G is the best option, when in fact it is not," Corner quoted the T4 group as saying. You can read Corner's full story at **www.itwire.com/content/view/13983/1095/**.

Dan Warne



How quickly they forget: Telstra 'misplaces' old long-reach ADSL promo.

your monthly broadband guide

APC is proud to partner with the independent broadband price-monitoring service Broadband Choice (***broadbandchoice.com.au***) to bring you the best ADSL and cable deals.

The comparison table on the following pages focuses on internet service providers that best serve the majority of *APC* readers' needs – those that have national coverage (though we have included some ISPs that provide higher than 2Mbit/s speed services in limited areas).

Only those meeting at least three of our four plan selection criteria are listed:

Budget plan: cheapest deal under $35/month.

Light plan: cheapest deal under $60/month, with at least 512Kbit/s speed and 1GB data.

Family plan: largest download allowance under $80/month, at least 512Kbit/s and 10GB data.

High-speed: cheapest 1.5Mbit/s plan under $100/month, with 10GB data minimum.

If an ISP has "unlimited downloads" but speed is throttled after reaching a certain limit, the portion in which you can get full-speed downloads is listed as its limit.

APC has picked the lowest price for a contract period of six months or less for broadband installation. Otherwise, the lowest-priced option was selected.

The installation price doesn't include a modem because you may find you'll get better value by buying one separately.

Can't find your provider in our list? That's because some of the largest ISPs, and many smaller ones, didn't meet the selection criteria. There may be ISPs we didn't list that will provide better deals (but which only service your local area or state).

ISPs enter their own information into the Broadband Choice database. ISPs can contact bc@whirlpool.net.au for more details on how to become part of the database.

Data for our table was extracted from the Broadband Choice database on 16 August 2007.

in brief

TELSTRA CONFIRMS CABLE UPGRADE

As revealed by *APC* last month, Telstra has confirmed it will upgrade its cable network by the end of the year to provide speeds of up to 30Mbit/s. However, CEO Sol Trujillo admitted the service would only be provided to 1.7 million premises – just 62% of the 2.7 million premises passed by BigPond Cable, but wouldn't say why. Telstra previously unlocked the speed on its cable network for customers willing to pay more, with a top speed of 17Mbit/s. However, many customers were disappointed to discover their cable speed didn't actually increase after subscribing to the plan, prompting Telstra to allow customers to return to the cheaper plans.

CHEAPER ADSL2+ MODEM

Billion has launched its cheapest ADSL2+ modem yet: the 5200G has an RRP of $99, which means it'll probably retail for about $80, and has ADSL2+ Annex M capability, four 10/100 Ethernet ports and 802.11g wireless. The modem doesn't have a stateful packet inspection firewall, and the antenna is not detachable, but they're two features that most people won't care too much about.

Name	Online	Budget plan (under $35)	Light plan (under $60, at least 512Kb/s, minimum 1GB data limit)	Family plan (under $80, at least 512Kb/s, minimum 10GB data limit)	High-speed plan (under $100, at least 1.5Mb/s, minimum 10GB data limit)	National	Spam filtering	Setup fee and contract length	Rapid transfer
Super-fast broadband ISPs (faster than 1.5Mb/s)									
aaNet ADSL2+	www.aanet.com.au	$19.90†* 1GB+ 24Mb/s	$19.90†* 1GB+ 24Mb/s	$79.90†* 32GB+ 24Mb/s	$49.90†* 16GB+ 24Mb/s	✘	✘	$119 12mths	✔
Comcen Internet ADSL	www.comcen.com.au	N/A	$59.95†* 5GB+ 8Mb/s	$69.95† 20GB 8Mb/s	$69.95† 20GB 8Mb/s	✔	✔	$99 6mths	✔
Comcen ADSL2+	www.comcen.com.au	$29.95†* 1GB+ 24Mb/s	$29.95†* 1GB+ 24Mb/s	$69.95† 40GB 24Mb/s	$59.95† 20GB 24Mb/s	✘	✔	$50 12mths	✘
Comstech Systems ADSL2+	www.comstech.com.au	N/A	$51.50† 5GB 24Mb/s	$77.50† 50GB 24Mb/s	$61.95† 10GB 24Mb/s	✔	✔	$133.95 6mths	✔
Dodo ADSL	www.dodo.com.au	N/A	$49.99†* 1GB+^8Mb/s	$79.99†* 10GB+^8Mb/s	$79.99†* 10GB+^8Mb/s	✔	$1.90	$129.99 1mth	✔
Dodo Super Fast ADSL2+	www.dodo.com.au	$9.99†* 1GB+^24Mb/s	$9.99†* 1GB+^24Mb/s	$79.99† 25GB+^24Mb/s	$39.99†* 10GB+^24Mb/s	✘	$1.90	$129.99 1mth	✘
Dodo High Speed ADSL2+	www.dodo.com.au	$29.99†* 1GB+^24Mb/s	$29.99†* 1GB+^24Mb/s	$79.99† 25GB+^24Mb/s	$49.99†* 10GB+^24Mb/s	✘	$1.90	$129.99 1mth	✘
EFTel ADSL	http://w3.eftel.com	N/A	$59.95†* 2GB 8Mb/s	$79.95†* 25GB+ 8Mb/s	$79.95†* 25GB+ 8Mb/s	✔	✔	$125 12mths	✔
Empcom ADSL2+	www.empcom.net	N/A	$59.95 20GB 24Mb/s	$59.95 20GB 24Mb/s	$59.95 20GB 24Mb/s	✘	✘	$129 6mths	✘
Green Tree Frog ADSL 2+ ULL	www.greentreefrog.net.au	$29.95† 2GB 24Mb/s	$29.95† 2GB 24Mb/s	$66† 20GB 24Mb/s	$66† 20GB 24Mb/s	✘	✔	$0 12mths	✘
iiNet broadband2+ ADSL (24Mbit)	www.iinet.net.au	$29.95† 500MB+ 24Mb/s	$39.95† 2GB+ 24Mb/s	$69.95† 20GB+ 24Mb/s	$59.95† 10GB+ 24Mb/s	✘	✔	$79.95 6mths	✘
ISP ADSL2+	http://w3.isp.net.au	N/A	$36.30†* 16GB 24Mb/s	$69.30†* 42GB 24Mb/s	$36.30†* 16GB 24Mb/s	✘	✔	$145.65 6mths	✔
Internode Extreme ADSL2+	www.internode.on.net	N/A	$59.95 20GB 24Mb/s	$74.95 30GB 24Mb/s	$59.95 20GB 24Mb/s	✘	✔	$129 6mths	✘
Koala ADSL 2+	www.koalatelecom.com.au	$34.95† 500MB 24Mb/s	$44.95† 5GB 24Mb/s	$74.95† 50GB 24Mb/s	$49.95† 10GB 24Mb/s	✔	✔	$149.95 6mths	✘
Letsgo Go ADSL2+ 24Mbit	www.letsgo.com.au	N/A	$39.95† 60GB 24Mb/s	$39.95† 60GB 24Mb/s	$39.95† 60GB 24Mb/s	✘	✔	$99 12mths	✘
Matilda Internet aDSL2+	www.matilda.net.au	N/A	$59.95†* 1GB 24Mb/s	$79.95† 20GB+ 24Mb/s	$69.95† 10GB+ 24Mb/s	✘	✔	$10 1mth	✘
Netspace Home ADSL2+	www.netspace.net.au	N/A	$39† 5GB+ 24Mb/s	$69† 20GB+ 24Mb/s	$49† 10GB+ 24Mb/s	✘	✔	$99 6mths	✘
Netspace SOHO ADSL2+	www.netspace.net.au	N/A	$49.95† 5GB 24Mb/s	$79.95† 20GB 24Mb/s	$59.95† 10GB 24Mb/s	✘	✔	$99 6mths	✘
OptusNet Cable	http://personal.optus.com.au	$29.95† 300MB+ 9.77Mb/s	$39.95† 2GB+ 9.77Mb/s	$69.95† 20GB+ 9.77Mb/s	$69.95† 20GB+ 9.77Mb/s	✘	✔	$89 12mths	✘
OptusNet DSL Direct	http://personal.optus.com.au	$29.95† 300MB+ 24Mb/s	$39.95† 2GB+ 24Mb/s	$69.95† 20GB+ 24Mb/s	$69.95† 20GB+ 24Mb/s	✘	✔	$89 12mths	✘
PrimusNET up to 8000Kbps	www.primus.com.au	$29.95† 1GB 8Mb/s	$29.95† 1GB 8Mb/s	$69.95† 20GB 8Mb/s	$59.95† 10GB 8Mb/s	✘	$4	$118 1mth	✘
Spin Internet	www.spin.net.au	N/A	$59.95†* 5GB+ 8Mb/s	$69.95† 20GB 8Mb/s	$69.95† 20GB 8Mb/s	✔	✔	$99 6mths	✔
Spin ADSL2+	www.spin.net.au	$29.95†* 1GB+ 24Mb/s	$29.95†* 1GB+ 24Mb/s	$69.95† 40GB 24Mb/s	$59.95† 20GB 24Mb/s	✘	✔	$50 12mths	✘
Telstra BigPond Cable	www.bigpond.com	$29.95* 200MB^7.8125Mb/s	$59.95† 12GB^7.8125Mb/s	$59.95† 12GB^7.8125Mb/s	$59.95† 12GB^7.8125Mb/s	✘	$2.50	$189 12mths #	✘
TPG Residential ADSL2+	www.tpg.com.au	$29.99* 600MB 24Mb/s	$39.99 3GB 24Mb/s	$69.99 40GB+ 24Mb/s	$49.99 18GB 24Mb/s	✘	✔	$59.95 12mths	✘
Westnet Broadband2+	www.westnet.com.au	$29.95†* 500MB 24Mb/s	$39.95† 2GB+ 24Mb/s	$69.95† 10GB+ 24Mb/s	$69.95† 10GB+ 24Mb/s	✘	$0.83	$139 12mths	✘
Yourhub Real Residential ADSL 2+	www.yourhub.com.au	N/A	$39† 5GB 24Mb/s	$59† 15GB 24Mb/s	$49† 10GB 24Mb/s	✔	$1	$180 12mths	✘
Yourhub Real Corporate ADSL 2+	www.yourhub.com.au	N/A	$60† 5GB 24Mb/s	$80† 15GB 24Mb/s	$70† 10GB 24Mb/s	✔	$1	$180 12mths	✘
Regular broadband ISPs (1.5Mb/s or less)									
.Netcall ADSL (Bundled)	www.netcall.com.au	$19.90†* 256MB+ 256Kb/s	$34.90†* 10GB+ 512Kb/s	$74.90†* 48GB+ 1.5Mb/s	$44.90†* 16GB+ 1.5Mb/s	✔	✔	$145 12mths	✔
.Netcall ADSL (Unbundled)	www.netcall.com.au	$24.90* 256MB+ 256Kb/s	$39.90* 10GB+ 512Kb/s	$79.90* 48GB+ 1.5Mb/s	$49.90* 16GB+ 1.5Mb/s	✔	✔	$145 12mths	✔
aaNet ADSL (Bundled)	www.aanet.com.au	$19.90†* 256MB+ 256Kb/s	$34.90†* 10GB+ 512Kb/s	$74.90†* 48GB+ 1.5Mb/s	$44.90†* 16GB+ 1.5Mb/s	✔	✘	$145 12mths	✔
aaNet ADSL (Unbundled)	www.aanet.com.au	$24.90* 256MB+ 256Kb/s	$39.90* 10GB+ 512Kb/s	$79.90* 48GB+ 1.5Mb/s	$49.90* 16GB+ 1.5Mb/s	✔	✘	$145 12mths	✔
AAPT ADSL	http://home.aapt.com.au	$29† 500MB 256Kb/s	$39† 12GB 512Kb/s	$49† 15GB 1.5Mb/s	$49† 15GB 1.5Mb/s	✔	✔	$0 1mth	✔
AlwaysONLINE ADSL	www.alwaysonline.net.au	$29.95* 500MB 256Kb/s	N/A	$75†* 12GB 1.5Mb/s	$75†* 12GB 1.5Mb/s	✔	✔	$100 6mths	✔
Aspark ADSL	www.aspark.com.au	N/A	$53.95† 25GB 512Kb/s	$53.95† 25GB 512Kb/s	$99.95† 35GB 1.5Mb/s	✔	✔	$110 1mth	✔
AuNix Broadband	www.aunix.com.au	$24.95* 200MB 256Kb/s	$39.95† 25GB 512Kb/s	$74.95† 35GB 1.5Mb/s	$74.95† 35GB 1.5Mb/s	✔	✔	$89 6mths	✔
Aussiewide Residential ADSL	www.aussiewide.com	N/A	$59.95 30GB 512Kb/s	$59.95 30GB 512Kb/s	$99 30GB 1.5Mb/s	✔	✔	$110 6mths	✔
Australia On Line ADSL	www.australiaonline.net.au	$24.95* 200MB 256Kb/s	$39.95 2GB+ 512Kb/s	$79.95 20GB 1.5Mb/s	$64.95 10GB 1.5Mb/s	✔	✔	$99 6mths	✔
Australis Internet ADSL	www.australis.net	$24.95* 200MB 256Kb/s	$49.95 5GB 512Kb/s	$64.95 50GB 512Kb/s	$59.95 30GB+ 1.5Mb/s	✔	✔	$139 1mth	✔
Beagle Internet ADSL	www.beagle.com.au	$19.95* 200MB 256Kb/s	$45.95 5GB 512Kb/s	$57.95 30GB 512Kb/s	N/A	✔	✔	$157 1mth	✔
BIT.net	www.bit.net.au	$19.95† 2GB 256Kb/s	$29.95† 2GB 512Kb/s	$69.95† 40GB 512Kb/s	$59.95† 10GB 1.5Mb/s	✔	✔	$132 6mths	✔
BKB Internet Home ADSL	www.bkb.net.au	N/A	$49.95 1GB^512Kb/s	$64.95 10GB^512Kb/s	$89.95 10GB^1.5Mb/s	✔	✔	$139 6mths	✔
Blackstump ADSL	www.blackstump.net.au	$19.95†* 200MB 256Kb/s	$44.95† 5GB 512Kb/s	$55.95† No limit 512Kb/s	$72.45†* 10GB 1.5Mb/s	✔	✔	$108 6mths	✔
Broadband Anywhere ADSL	www.broadbandanywhere.com.au	N/A	$39.95 5GB^512Kb/s	$69.95 40GB^512Kb/s	$69.95 10GB^1.5Mb/s	✔	✔	$132 12mths	✔
BBI Flat Rate DSL	www.brownbear.net.au	$32.95 2GB 256Kb/s	$39.95 2GB 512Kb/s	$74.95 60GB 512Kb/s	$59.95 10GB 1.5Mb/s	✔	✔	$119 6mths	✔
BBI Excess DSL	www.brownbear.net.au	$32.95* 2GB 256Kb/s	$39.95* 2GB 512Kb/s	$74.95* 60GB 512Kb/s	$59.95* 10GB 1.5Mb/s	✔	✔	$119 6mths	✔
Brown Bear DSL/Phone	www.brownbear.net.au	$19.95†* 1GB 256Kb/s	$29.95†* 1GB 512Kb/s	$69.95† 60GB 512Kb/s	$59.95† 15GB 1.5Mb/s	✔	✔	$119 6mths	✔
CEinternet Broadband	www.ceinternet.com.au	$29.95* 200MB 256Kb/s	$59.90* 1GB 1.5Mb/s	N/A	$85.90* 10GB 1.5Mb/s	✔	$2.50	$99 1mth	✔
Central Coast Internet ADSL	www.cci.net.au	$34.95* 500MB 256Kb/s	$54.95* 1GB 512Kb/s	$64.95* 10GB 512Kb/s	N/A	✔	✔	$132 6mths	✔
Chariot ADSL	www.chariot.net.au	$29.95* 500MB 256Kb/s	$39.95 2GB 512Kb/s	$59.95 40GB 512Kb/s	$69.95 25GB 1.5Mb/s	✔	✔	$110 6mths	✔
Comcen Internet ADSL	www.comcen.com.au	$19.95†* 300MB 256Kb/s	$29.95†* 2GB+ 512Kb/s	$59.95† No limit 512Kb/s	$49.95† 15GB 1.5Mb/s	✔	✔	$99 6mths	✔
Comstech Systems ADSL	www.comstech.com.au	$33.95 500MB 256Kb/s	$46.50 3GB 512Kb/s	$72.50 50GB 512Kb/s	$72.50 10GB 1.5Mb/s	✔	✔	$133.95 6mths	✔
Concept Networks ADSL	www.conceptual.net.au	$29.95* 500MB 256Kb/s	$39.95* 1GB 512Kb/s	$69.95 30GB 512Kb/s	$69.95* 15GB 1.5Mb/s	✔	✔	$99 6mths	✔
CyberOne ADSL	www.cyberone.com.au	$19.95* 200MB 256Kb/s	$39.95* 1GB 512Kb/s	$64.95† No limit 512Kb/s	$74.95† 15GB+ 1.5Mb/s	✔	✔	$99 1mth	✔
dataoz Residential ADSL	www.dataozsolutions.com.au	N/A	$44.95 3GB 512Kb/s	$69.95 50GB 512Kb/s	$54.95 10GB 1.5Mb/s	✔	✔	$129.95 6mths	✔
Diamond Telecom ADSL	www.diamondtelecom.com.au	N/A	$54.95† 25GB 512Kb/s	$54.95† 25GB 512Kb/s	$89.95† 35GB 1.5Mb/s	✔	✘	$80 6mths	✔
Dinkum Internet ADSL	www.dinkum.net.au	$24.95 200MB 256Kb/s	$49.95 5GB 512Kb/s	$69.95 30GB 512Kb/s	$69.95 15GB 1.5Mb/s	✔	✔	$129 6mths	✔
Dodo ADSL	www.dodo.com.au	$19.99†* 500MB+^256Kb/s	$29.99†* 1.5GB+^1.5Mb/s	$79.99† 25GB+^1.5Mb/s	$49.99†* 10GB+^1.5Mb/s	✔	$1.90	$129.99 1mth	✔
DragNet ADSL	www.dragnet.com.au	$29.95* 200MB^256Kb/s	$45.95* 1.5GB 512Kb/s	$69.95 15GB 512Kb/s	$79.95 15GB 1.5Mb/s	✔	✔	$119 6mths	✔
Ecomtel ADSL	www.ecomtel.com.au	$19.90†* 300MB 256Kb/s	$54.90†* 100GB 512Kb/s	$54.90†* 100GB 512Kb/s	$74.90†* 100GB 1.5Mb/s	✔	✔	$120 1mth	✔

Regular broadband ISPs (1.5Mb/s or less)

Name	Online	Budget plan (under $35)	Light plan (under $60, at least 512Kb/s, minimum 1GB data limit)	Family plan (under $80, at least 512Kb/s, minimum 10GB data limit)	High-speed plan (under $100, at least 1.5Mb/s, minimum 10GB data limit)	National	Spam filtering	Setup fee and contract length	Rapid transfer
EFTel ADSL	http://w3.eftel.com	$19.95†* 500MB 256Kb/s	$39.95†* 2GB 512Kb/s	$59.95†* 25GB+ 512Kb/s	$69.95†* 25GB+ 1.5Mb/s	✔	✔	$125 12mths	✔
Empcom ADSL	www.empcom.net	N/A	$39.95 5GB 512Kb/s	$54.95 20GB 512Kb/s	$69.95 20GB 1.5Mb/s	✔	✘	$129 6mths	✔
eTelecom ADSL	www.etelecom.com.au	$19.95†* 200MB 256Kb/s	$39.95†* 1GB 512Kb/s	$69.95†* 15GB 1.5Mb/s	$69.95†* 15GB 1.5Mb/s	✔	✔	$99 12mths	✔
Fonebox ADSL Broadband Internet	www.fonebox.com.au	$29.90* 200MB 256Kb/s	$49.90 5GB 512Kb/s	$79.90 30GB 512Kb/s	$79.90 10GB 1.5Mb/s	✔	✔	$99 6mths	✔
Green Tree Frog ADSL	www.greentreefrog.net.au	N/A	$55 40GB 512Kb/s	$77 100GB 512Kb/s	$99 80GB 1.5Mb/s	✔	✔	$132 6mths	✔
Green Tree Frog Business ADSL	www.greentreefrog.net.au	N/A	$55* 40GB 512Kb/s	$77* 100GB 512Kb/s	$99* 80GB 1.5Mb/s	✔	✔	$132 6mths	✔
Hande Communications ADSL - Shaped	www.hande.net.au	$32.95 500MB^ 256Kb/s	$44.95 1.5GB^ 512Kb/s	$79.95 30GB^ 512Kb/s	$84.95 10GB^ 1.5Mb/s	✔	✔	$119.95 1mth	✔
Hande Communications ADSL - Usage Based	www.hande.net.au	$32.95* 500MB^ 256Kb/s	$44.95* 1.5GB^ 512Kb/s	$69.95* 15GB^ 512Kb/s	$89.95* 15GB^ 1.5Mb/s	✔	✔	$119.95 1mth	✔
HugoNet Home ADSL Broadband	www.hugonet.com.au	$29.95* 250MB+ 256Kb/s	$49.95* 1GB+ 512Kb/s	$69.95 25GB+ 512Kb/s	$79.95 20GB+ 1.5Mb/s	✔	✔	$110 12mths	✔
IF Com ADSL	www.ifcom.com.au	$24.95†* 200MB 256Kb/s	$49.95† 25GB 512Kb/s	$49.95† 25GB 512Kb/s	$84.95† 35GB 1.5Mb/s	✔	✔	$99 12mths	✔
iiNet broadband1 ADSL	www.iinet.net.au	$29.95† 500MB+ 256Kb/s	$39.95† 2GB+ 512Kb/s	N/A	$99.95 10GB+ 8Mb/s	✔	✔	$79.95 6mths	✔
ISP ADSL	http://w3.isp.net.au	$33* 3GB 256Kb/s	$42.90* 5GB 512Kb/s	$77 No limit 512Kb/s	$69.30* 25GB 1.5Mb/s	✔	✔	$132 6mths	✔
IntegrityNet ADSL	www.integritynet.com.au	$29.95* 200MB 256Kb/s	$59.95* 5GB 512Kb/s	$79.95* 20GB 512Kb/s	$99.95* 15GB 1.5Mb/s	✔	✔	$139 12mths	✔
Internet Information Group ADSL	www.iig.com.au	N/A	$59* 5GB 512Kb/s	$79* 15GB 512Kb/s	$99* 15GB 1.5Mb/s	✔	✔	$120 12mths	✔
Internode Home ADSL	www.internode.on.net	N/A	$39.95 5GB 512Kb/s	$69.95 30GB 512Kb/s	$54.95 10GB 1.5Mb/s	✔	✔	$129 6mths	✔
Interwerks ADSL	www.interwerks.net.au	$34.95* 1GB 256Kb/s	$49.95* 5GB 512Kb/s	$79.95 No limit 512Kb/s	$99.95* 25GB 1.5Mb/s	✔	✔	$119 3mths	✔
iSage Internet ADSL	www.isage.aunz.net	$24.95* 200MB 256Kb/s	$44.95 25GB+ 512Kb/s	$79.95 35GB+ 1.5Mb/s	$76.95† 15GB+ 8Mb/s	✔	✔	$99 6mths	✔
Ispace ADSL	www.ispace.net.au	$29.95* 200MB 256Kb/s	$49.95 5GB 512Kb/s	$79.95 60GB 512Kb/s	$79.95 15GB 1.5Mb/s	✔	✔	$120 6mths	✔
ITEL ADSL	www.itel.net	$34.95†* 4GB 256Kb/s	$49.95†* 4GB 512Kb/s	$54.95† 60GB 512Kb/s	$79.95† 60GB 1.5Mb/s	✔	✔	$129 12mths	✔
ADSL Broadband	www.itginternet.net.au	$31.79* 200MB 256Kb/s	$54.89 5GB 512Kb/s	$65.89 30GB 512Kb/s	$76.89 15GB 1.5Mb/s	✔	✔	$95 6mths	✔
JaziNET ADSL	www.jazi.net	N/A	$49.50 25GB 512Kb/s	$49.50 25GB 512Kb/s	$88 35GB 1.5Mb/s	✔	✔	$110 1mth	✔
Jump Internet ADSL	http://jumpnet.com.au	$30* 200MB 256Kb/s	$50* 2GB 512Kb/s	$80 30GB 512Kb/s	$80 15GB 1.5Mb/s	✔	✘	$0 12mths	✔
Koala ADSL	www.koalatelecom.com.au	$29.95† 500MB 256Kb/s	$39.95† 3GB 512Kb/s	$64.95† 50GB 512Kb/s	$49.95† 10GB 1.5Mb/s	✔	✔	$129.95 6mths	✔
Lets Go ADSL	www.letsgo.com.au	N/A	$59.95 30GB 512Kb/s	$59.95 30GB 512Kb/s	$79.95 30GB 1.5Mb/s	✔	✔	$99 6mths	✔
Lizzy ADSL	www.lizzy.com.au	$24.95* 200MB 256Kb/s	$39.95 2GB+ 512Kb/s	$79.95 20GB 1.5Mb/s	$64.95 10GB 1.5Mb/s	✔	✔	$99 6mths	✔
Matilda Internet DSL	www.matilda.net.au	$29.95* 200MB 256Kb/s	$49.95* 1GB 512Kb/s	$59.95 10GB+ 512Kb/s	$69.95 10GB+ 1.5Mb/s	✔	✔	$110 1mth	✔
McPherson Media ADSL	www.mcmedia.com.au	$29.95* 200MB^ 256Kb/s	$49.95* 3GB^ 512Kb/s	$79.95* 25GB^ 512Kb/s	$89.95* 10GB^ 1.5Mb/s	✔	✔	$99 12mths	✔
Midcoast Internet DSL	www.midcoast.com.au	$28.50* 200MB^ 256Kb/s	$46.50* 1GB^ 512Kb/s	$69* 10GB^ 512Kb/s	$84* 10GB^ 1.5Mb/s	✔	✔	$99 6mths	✔
Midcoast Internet ADSL	www.midcoast.com.au	N/A	$55* 2GB 512Kb/s	$70* 10GB 512Kb/s	$85* 10GB 1.5Mb/s	✔	✔	$99 6mths	✔
Neighbourhood Cable ADSL	www.ncable.net.au	$27.95* 200MB 256Kb/s	N/A	$69.95 10GB 512Kb/s	$99.95 10GB 1.5Mb/s	✔	✔	$99 12mths	✔
Netspace Home ADSL	www.netspace.net.au	$29.95* 300MB 256Kb/s	$29.95† 1GB+ 512Kb/s	$69.95† 20GB+ 1.5Mb/s	$54.95† 10GB+ 1.5Mb/s	✔	✔	$99 6mths	✔
Netspace SOHO ADSL	www.netspace.net.au	N/A	$49.95† 15GB 512Kb/s	$79.95† 20GB 1.5Mb/s	$64.95† 10GB 1.5Mb/s	✔	✔	$99 6mths	✔
NetSpeed ADSL	www.netspeed.com.au	$19.95†* 200MB 256Kb/s	$34†* 1GB+ 512Kb/s	$74† 30GB+ 512Kb/s	$74†* 10GB+ 1.5Mb/s	✔	$2	$139 12mths	✔
NORNET ADSL	www.nor.com.au	$29.95* 200MB 256Kb/s	$59.95* 5GB 512Kb/s	$79.95* 15GB 1Mb/s	$99.95* 12GB 8Mb/s	✔	✔	$160 6mths	✔
North Queensland Telecom ADSL	www.nqtelecom.com.au	$24.95* 200MB 256Kb/s	$49.95* 1GB 1.5Mb/s	$54.95 25GB 512Kb/s	$89.95 35GB 1.5Mb/s	✔	✔	$99 1mth	✔
Optraweb ADSL	www.optraweb.com.au	N/A	$44.95 5GB 512Kb/s	$74.95 60GB 512Kb/s	$81.95 15GB 1.5Mb/s	✔	✔	$129 6mths	✔
Optraweb Excess DSL	www.optraweb.com.au	$32.95* 2GB 256Kb/s	$39.95* 2GB 512Kb/s	$74.95* 60GB 512Kb/s	$81.95* 15GB 1.5Mb/s	✔	✔	$129 6mths	✔
Optraweb Bundle DSL	www.optraweb.com.au	$27.95† 2GB 256Kb/s	$34.95† 2GB 512Kb/s	$69.95† 60GB 512Kb/s	$80.95† 15GB 1.5Mb/s	✔	✔	$129 6mths	✔
Ozefone Digital	www.ozefone.com	$34.50* 1GB 256Kb/s	$44.50* 2GB 512Kb/s	N/A	$89.50* 10GB 1.5Mb/s	✔	✔	$129 6mths	✔
OziSP ADSL	www.ozisp.com.au	N/A	$48.40 1.5GB 512Kb/s	$79.75 30GB 512Kb/s	$91.30 10GB 8Mb/s	✔	✔	$132 6mths	✔
Pacific Internet DSL	www.pacific.net.au	$29.95* 250MB 256Kb/s	$39.95 1GB 512Kb/s	$54.95 No limit 512Kb/s	$49.95† 10GB 1.5Mb/s	✔	✔	$99 6mths	✔
Primus Flexible Broadband	www.primus.com.au	$24.95† 500MB 256Kb/s	$34.95† 1GB 512Kb/s	$69.95† 20GB 1.5Mb/s	$59.95† 12GB 1.5Mb/s	✔	$4	$118 1mth	✔
Quantum ADSL	www.quantumtelecom.com.au	N/A	$49.95† 25GB 512Kb/s	$79.95† 35GB 1.5Mb/s	$79.95† 35GB 1.5Mb/s	✔	✔	$140 1mth	✔
Rabbit Internet ADSL	http://rabbit.com.au	$27.95†* 200MB 256Kb/s	$34.90†* 1GB 512Kb/s	$80†* 60GB 1.5Mb/s	$59†* 10GB 1.5Mb/s	✔	✔	$104.50 6mths	✔
Realcom ADSL	www.realcomaust.com.au	$27.95* 200MB 256Kb/s	$54.95 25GB 512Kb/s	$54.95 25GB 512Kb/s	$94.95 35GB 1.5Mb/s	✔	✔	$0 12mths	✔
REEDS.NET Internet Services ADSL	www.reeds.net.au	N/A	$49 25GB 512Kb/s	$79.95 35GB 1.5Mb/s	$79.95 35GB 1.5Mb/s	✔	✔	$99 6mths	✔
Saco Technology ADSL	www.sacotech.com.au	N/A	$45.95† 2GB 512Kb/s	$75.95† 60GB 512Kb/s	$74.95† 15GB 1.5Mb/s	✔	✔	$129.95 6mths	✔
Simpliciti ADSL	www.simpliciti.com.au	$31 500MB 256Kb/s	$47 5GB 512Kb/s	$57 30GB 512Kb/s	$87 10GB 1.5Mb/s	✔	✔	$99 3mths	✔
SkyWays ADSL	www.skyways.net.au	$29.95* 200MB 256Kb/s	$49.95* 10GB 512Kb/s	$69.95 No limit 512Kb/s	$99.95 30GB 1.5Mb/s	✔	✔	$109 12mths	✔
Skyways DSL + Phone	www.skyways.net.au	$29.95†* 5GB 256Kb/s	$39.95†* 10GB 512Kb/s	$59.95† No limit 512Kb/s	$89.95†* 30GB 1.5Mb/s	✔	✔	$109 6mths	✔
Soul ADSL	www.mysoul.com.au	$29.95 No limit 256Kb/s	$44.95† 5GB 512Kb/s	$64.95† 10GB 1.5Mb/s	$64.95† 10GB 1.5Mb/s	✔	✔	$119 6mths	✔
Southern Cross Telco ADSL	www.sctelco.com.au	$29.95† 400MB 256Kb/s	$39.95† 2GB 512Kb/s	$79.95† 30GB 1.5Mb/s	$79.95† 30GB 1.5Mb/s	✔	✔	$99 6mths	✔
Spin Internet	www.spin.net.au	$19.95†* 300MB 256Kb/s	$29.95†* 2GB+ 512Kb/s	$59.95† No limit 512Kb/s	$49.95† 15GB 1.5Mb/s	✔	✔	$99 6mths	✔
Supernerd SuperDSL	www.supernerd.com.au	$26.95 1GB 256Kb/s	$44.95 10GB 512Kb/s	$59.95 40GB 512Kb/s	$59.95 15GB 1.5Mb/s	✔	✔	$60 1mth	✔
TalkTODAY ADSL	www.talktoday.com.au	$29.95† 500MB^ 256Kb/s	$41.95† 5GB^ 512Kb/s	$64.95† 100GB^ 512Kb/s	$69.95† 30GB^ 1.5Mb/s	✔	✔	$119 6mths	✔
telaustralia Bus ADSL	www.telaustralia.com.au	N/A	$49.95† 25GB 512Kb/s	$79.95† 35GB 1.5Mb/s	$79.95† 35GB 1.5Mb/s	✔	✔	$139 6mths	✔
Telstra BigPond ADSL	www.bigpond.com	$29.95* 200MB^ 256Kb/s	N/A	$69.95† 12GB^ 1.5Mb/s	$69.95† 12GB^ 1.5Mb/s	✔	$2.50	$99 12mths	✔
Fat Free DSL Broadband	www.fatfree.com.au	$24* 200MB 256Kb/s	$49 25GB 512Kb/s	$49 25GB 512Kb/s	$89 35GB 1.5Mb/s	✔	✔	$110 12mths	✔
TrumpNet ADSL	www.trump.net.au	$29.95* 200MB^ 256Kb/s	$54.95 1GB 512Kb/s	$75.95 30GB 512Kb/s	$99.95 30GB 1.5Mb/s	✔	✔	$135 12mths	✔
TSN Broadband	www.tsninternet.com.au	N/A	$49.95 5GB 1.5Mb/s	$69.95 20GB 1.5Mb/s	$69.95 20GB 1.5Mb/s	✔	✔	$129 6mths	✔
Unison DSL	www.unisonmobile.com.au	$27.95* 200MB 256Kb/s	$54.95 25GB 512Kb/s	$54.95 25GB 512Kb/s	$84.70 35GB 1.5Mb/s	✔	✔	$100 1mth	✔
Water Sprite ADSL1 Shaped plans	www.watersprite.net.au	$35 2GB 256Kb/s	$42 2GB 512Kb/s	$70 60GB 512Kb/s	$65 10GB 1.5Mb/s	✔	✔	$150 6mths	✔
Water Sprite ADSL1 Excess charged plans	www.watersprite.net.au	$35* 2GB 256Kb/s	$42* 2GB 512Kb/s	$70* 60GB 512Kb/s	$65* 10GB 1.5Mb/s	✔	✔	$150 6mths	✔
Westnet Broadband1	www.westnet.com.au	$29.95† 500MB 256Kb/s	$34.95† 1GB 512Kb/s	$69.95† 20GB+ 1.5Mb/s	$59.95† 10GB+ 1.5Mb/s	✔	$0.83	$99 6mths	✔
Winshop ADSL	www.winshop.com.au	$29.95 500MB 256Kb/s	$39.95 3GB 512Kb/s	$59.95 15GB 1.5Mb/s	$59.95 15GB 1.5Mb/s	✔	✔	$139 12mths	✔
Residential ADSL	www.yourhub.com.au	$34.95* 300MB 256Kb/s	$59.95 5GB 512Kb/s	$79.95 15GB 1.5Mb/s	$79.95 10GB 1.5Mb/s	✔	$2	$110 12mths	✘
ZCTS ADSL	www.zcts.net	N/A	$49.50 25GB 512Kb/s	$49.50 25GB 512Kb/s	$88 35GB 1.5Mb/s	✔	✔	$110 1mth	✔

*Key: * ISP charges excess usage fees when you exceed your download limit; † This price only available if bundled with long distance telephony from the ISP; + Additional download allowance available with this plan for use in off-peak periods; ^ ISP combines sent and received data when calculating usage. # Minimum BigPond Cable setup fee is based on 12-month contract with modem included. Telstra does not offer a BYO modem option.*

BEST TECH

APC's independent reviewers point to the best technologies in the top-selling product categories each month. We only change products when a better one comes along. What you see here is the best technology available on the market.

BEST VALUE

The **Best Value** award is for products which offer a good combination of features for a reasonable price.

BEST OVERALL

The **Best Overall** award is for products we believe are the best, regardless of price.

Best Tech is edited by William Maher. Contributors to the *APC* Best Tech guide: Ashton Mills, Nick Race, Tony Sarno, Dan Warne, Chris Zammit and Stephen Withers.

DESKTOP PCs – GENERAL USE

Enspire Vitesse XP2

CONTACT Enspire Digital
ONLINE www.enspiredigital.com.au
PRICE $2,899

This is an excellent do-everything PC with Intel's new P35 chipset, Core 2 Duo E6700, 2GB of high performance DDR2-800 memory and Nvidia GeForce 8800 GTS graphics. You get a 500GB SATA II drive and a big Samsung 205BW 20in widescreen LCD with a TV tuner. A good mix of CPU grunt, graphics and storage.

Altech Sputnik

CONTACT Altech Computers
ONLINE www.altech.com.au
PRICE $1,499

The Sputnik has great potential for upgrades; using the P35 chipset, the sky's the limit as far as CPU upgrades go. The CPU is an Intel Core 2 Duo E6600, fitted with 1GB Corsair Value Select DDR2-667 RAM. It cuts it a little fine for Vista, but it has Windows XP Pro SP2. You also get an Nvidia GeForce 8500GT.

MOTHERBOARDS

GigabyteP35T-DQ6

CONTACT Gigabyte
ONLINE www.gigabyte.com.au
PRICE $439

A solid-performing board to support the Intel 1,333MHz frontside bus Core 2 Duo and Core 2 Quad CPUs. Supports up to four modules of DDR3 and eight SATA drives plus has some legacy connectors for older hardware. Also, two x16 slots for CrossFire and three PCI Express x1 ports.

Foxconn P9657AA-8KS2H

CONTACT Foxconn
ONLINE www.foxconnchannel.com
PRICE $165

This board only has a single x16 PCI Express slot, so it can't be used for CrossFire or SLI. However, it also has one x1 and one x4 PCI slot ready for the next-generation of PCI-E expansion cards. Combine this with HD audio, five SATA and one eSATA port and you've got top value for your money.

SMARTPHONES

Blackberry 8707G

CONTACT Optus
ONLINE www.optus.com.au
PRICE $999 outright (or plans)

We like the new 8800, but, for us, the improved interface and screen don't outweigh the lack of 3G and the cramped keyboard. We're sticking with the 8707G, though the 8800 and Samsung's BlackJack are viable alternatives. We like the 8707G's big screen, fine-tuned keyboard, 3G wireless

Nokia E61

CONTACT Nokia
ONLINE www.nokia.com.au
PRICE $749

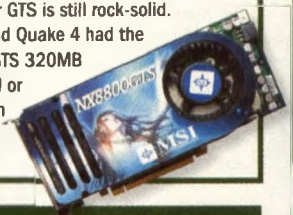
It's hard to fault Nokia's 3G "BlackBerry Killer": it has the comfortable BlackBerry form factor along with a QWERTY keyboard and fits comfortably in your pocket – plus, you can take your pick of push email service. There are two other killer features: inbuilt Wi-Fi and Nokia's new web browser.

VIDEO CARDS

MSI GeForce 8800 GTS 320MB

CONTACT MSI
ONLINE www.msicomputer.com.au
PRICE $479

There is a pretty big difference between the GTX and the GTS models on paper, but the performance of the much cheaper GTS is still rock-solid. Testing in F.E.A.R. and Quake 4 had the card singing – the GTS 320MB version never slowed or shuddered, even with the system-killing 16xAA turned on.



Gigabyte Radeon HD 2600XT

CONTACT Gigabyte
ONLINE www.gigabyte.com.au
PRICE $219

A killer home theatre card with fanless cooling and HD features, this HD 2600 XT is also a great-value mid-range games card. It clocked 4,695 on the testbench in 3DMark06, so it's got enough grunt, and comes with an 800MHz CPU and 256MB. Add HDMI and you've got a great card for games and video.

NEW ENTRY

LCD MONITORS

HP w1907

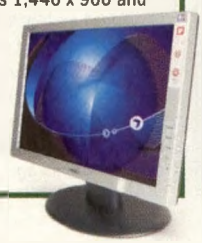
CONTACT HP
ONLINE www.hp.com.au
PRICE $549

It's not the 24in Dell behemoth we featured in April's issue, but, for most people, this 19in model is probably a better fit. It was our pick of the glossy screens in May's LCD monitor roundup (see page 52), with a bright, crystal-clear screen and less of the darkened corners seen in some rivals.

Chimei CMV946D

CONTACT Protac
ONLINE www.protac.com.au
PRICE $299

This is about as cheap as you can get for a 19in wide-screen LCD. Resolution is 1,440 x 900 and image quality is crisp and colours excellent. We found some noise present, but otherwise we didn't find any significant problems. You get D-Sub/DVI-D inputs and a 2ms response time.

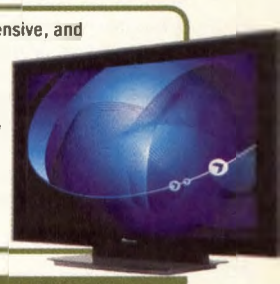


HD DISPLAYS

Pioneer PDP-5000EX 1080p

CONTACT Pioneer
ONLINE www.pioneer.com.au
PRICE $10,999

It's massive, ludicrously expensive, and has possibly one of the best pictures we've seen. Fast-moving images stay crystal clear, and don't be fooled by the picture in the shops – with the lights out, the contrast and definition is second to none.



Toshiba Regza 32WL68A

CONTACT Toshiba
ONLINE www.toshiba.com.au
PRICE $1,999 (without tuner)

Toshiba's just-released Regza range raises the bar for LCD-based TVs. It comes in two versions, with a HDTV tuner and without. We've tested the 1080i/720p 32WL68A 32in model, which uses a 100Hz engine to address the traditional problem of motion blur experienced by LCDs.

INTERNAL HARD DISKS

Hitachi Deskstar 7K1000

CONTACT Legend Corporation
ONLINE www.legendcorporate.com
PRICE $599

This is the world's first 1TB drive available for PCs. *APC*'s Labs Editor Nick Race tested it and said: "It's big storage! *Seriously* big. And it has the performance of other top drives in the market." Using perpendicular magnetic recording technology and a 32MB cache, this is the new top dog of hard drives.

Seagate Barracuda 7200.10 320GB

CONTACT Synnex
ONLINE www.synnex.com.au
PRICE $225

It's quiet and packs plenty of punch, but be careful in tight enclosures: it's hot. Though the RRP for this drive is $225, they can be found on the street for less than $200. The 16MB cache model is fast enough for most uses, but if you're serious about video editing, splurge for a 10,000rpm drive.

ADSL2+ MODEM/ROUTERS

Dynalink RTA1025W

CONTACT Dynalink
ONLINE www.dynalink.com.au
PRICE $179

This modem is a bargain at $179. It performed well in our ADSL2+ and wireless tests and was also a strong performer in Annex M tests. The only area for improvement is long-range wireless, where the 1025W only managed 800Kbit/s, but this won't be a significant concern for most people.

Dynalink RTA1046VW

CONTACT Dynalink
ONLINE www.dynalink.com.au
PRICE $279

Performance is nearly as good as the 1025W, but for your extra $100 you get two inbuilt VoIP ports for you to connect standard phones to and make two calls at the same time. And if you want the fastest possible modem at 1KM, this is it: 19.85Mbit/s.

VOIP ADAPTORS

Netcomm V300

CONTACT NetComm
ONLINE www.netcomm.com.au
PRICE $199

Low upstream speeds on most broadband connections mean QoS support makes a big difference to how you sound during a VoIP call. In *APC*'s testing, the V300 delivered good voice quality with minimum impact on data traffic. It also lets you use one handset for VoIP and PSTN calls.

Netcomm V100

CONTACT NetComm
ONLINE www.netcomm.com.au
PRICE $128

Connect the V100 to a power point, your network and a handset, and you're in business. Available as a generic model or preconfigured for certain VoIP providers, which makes it as simple as it gets. Some people prefer a box that allows more diddling around with configurations, but we're attracted to the simplicity.

SERVERS – SMALL BUSINESS

PowerEdge 2900

CONTACT Dell
ONLINE www.dell.com.au
PRICE From $3,487

This Dell is a beauty. It's dual-socket, dual-core and sports up to two of the new Intel Woodcrest Xeons. The default config features a single Xeon 5140 at 2.33GHz with 1,333MHz FSB, backed by 2GB of DDR2 533 FB DIMMS and an 80GB SATA II hard drive. Dell offers a 3-year on-site warranty on this hugely upgradable server.

HP ProLiant ML110 G3 SMB Bundle

CONTACT HP
ONLINE www.hp.com.au
PRICE $1,499

Not a real powerhouse, but the price can't be beaten. This unit is a single CPU Pentium 4 3.0GHz with 1GB of RAM and two 80GB hard disk drives. Though it won't break any speed records, it will suit a small business's needs. The server is bundled with Microsoft Small Business Server 2003 Standard Edition.

PRINTERS – HOME

Canon PIXMA iP5300 Bubble Jet

CONTACT Canon
ONLINE www.canon.com.au
PRICE $249

This is the perfect all-rounder for the home. It prints high-quality photos and churns through mono text documents at speeds of up to 31ppm, with quality approaching that of a laser. It can also print directly to CDs and DVDs and will deal with school projects, digital photos, documents, anything!

Epson Stylus C79

CONTACT Epson
ONLINE www.epson.com.au
PRICE $89

This is a cheap and cheerful printer that still delivers good results. With its four separate ink cartridges and extra-fine printing, it marries good print and photo quality with print speeds of up to 22ppm (black text) and 12ppm (colour). Be aware that your main ongoing cost will be the ink.

MULTIFUNCTION – HOME

Canon Pixma MP830

CONTACT Canon
ONLINE www.canon.com.au
PRICE $549

The MP780's successor, the MP830 soundly beats the competition. It can print photo-lab-quality 4 x 6in home snaps and has all the gear needed by a home office, such as a copier, scanner and G3 fax machine (together with an automatic 35-page document feeder and duplexing ability).

Lexmark X4550

CONTACT Lexmark
ONLINE www.lexmark.com.au
PRICE $199

An inkjet all-in-one, this unit has good print, scan and copy quality, especially given the relatively low price. At 46cm wide, it's quite compact for an all-in-one, with wireless and USB connectivity. Media cards (SD, MMC, xD, Memory Stick and CF) and USB storage devices are supported, and nominal print speed is 18ppm for colour documents.

NEW ENTRY

GPS DEVICES

Garmin Nuvi 660

CONTACT GME
ONLINE www.gme.net.au
PRICE $1,199

As a sat-nav, the Nuvi 660 is the cream of the crop. Stellar 4.3in wide-screen, large buttons and a user-friendly interface make it a breeze to use, and the main navigation screen is clear and uncluttered. Acquiring a GPS signal is speedy thanks to the flip-up antenna, and correcting wrong turns is also snappy.

Mio C520

CONTACT Mio
ONLINE www.mio-tech.com.au
PRICE $699

It's a tad more expensive than the ASUS S102 PND, but the Mio offers great bang for buck, with features that until now have only been found in more expensive devices. With a 4.3in, 480 x 272 wide-screen display and zippy 400MHz processor, it's able to quickly calculate routes and show plenty of detail.

NEW ENTRY

NOTEBOOKS – PERSONAL

Toshiba A200

CONTACT Toshiba
ONLINE www.toshiba.com.au
PRICE $2,299 (as reviewed)

The Toshiba outshone its rivals in our Labs tests with great Core 2 Duo performance and solid battery life. Unlike some heavier rivals, this 15.4in unit is a portable 2.7kg, and for the price it's stacked with features, including a 160GB hard drive, 802.11n networking, fingerprint reader and webcam. It also handles Vista with ease.

Excel M665N

CONTACT Protac
ONLINE www.protac.com.au
PRICE $1,899

This was the only sub-$2,000 system in our recent Vista notebook roundup. It's fine for general desktop apps, though 3D performance and battery life aren't great. Considering you're getting a T7200 2GHz Core 2 Duo with 2GB RAM, 120GB drive and Vista Home Premium, this is good value.

NOTEBOOKS – ULTRAPORTABLE

Sony VAIO VGNtz18GNx

CONTACT Sony
ONLINE www.sony.com.au
PRICE $4,299

Battery life with a solid state hard disk drive is phenomenal. In battery-saving mode, we got over 8.5 hours of 'real work' done with Wi-Fi off, and 5.5 hours of DVD playback. This Sony VAIO is an 11.1in model weighing in at less than 1.2kg, including an optical drive (and battery). It includes an ultra-thin LED-lit LCD panel, running at 1,366 x 768.

NEW ENTRY

Fujitsu Lifebook S6311

CONTACT Fujitsu
ONLINE www.lifebook.com.au
PRICE $2,499

It's a bit heavier than the Fujitsu P7230, but this 1.7kg unit (weighs more with DVD drive) still provides good value. The base platform is probably a better bet for Vista, with Core 2 Duo, 2GB RAM and Intel 945G graphics. You get a 13.3in screen and a 120GB hard drive, plus a two-year warranty.

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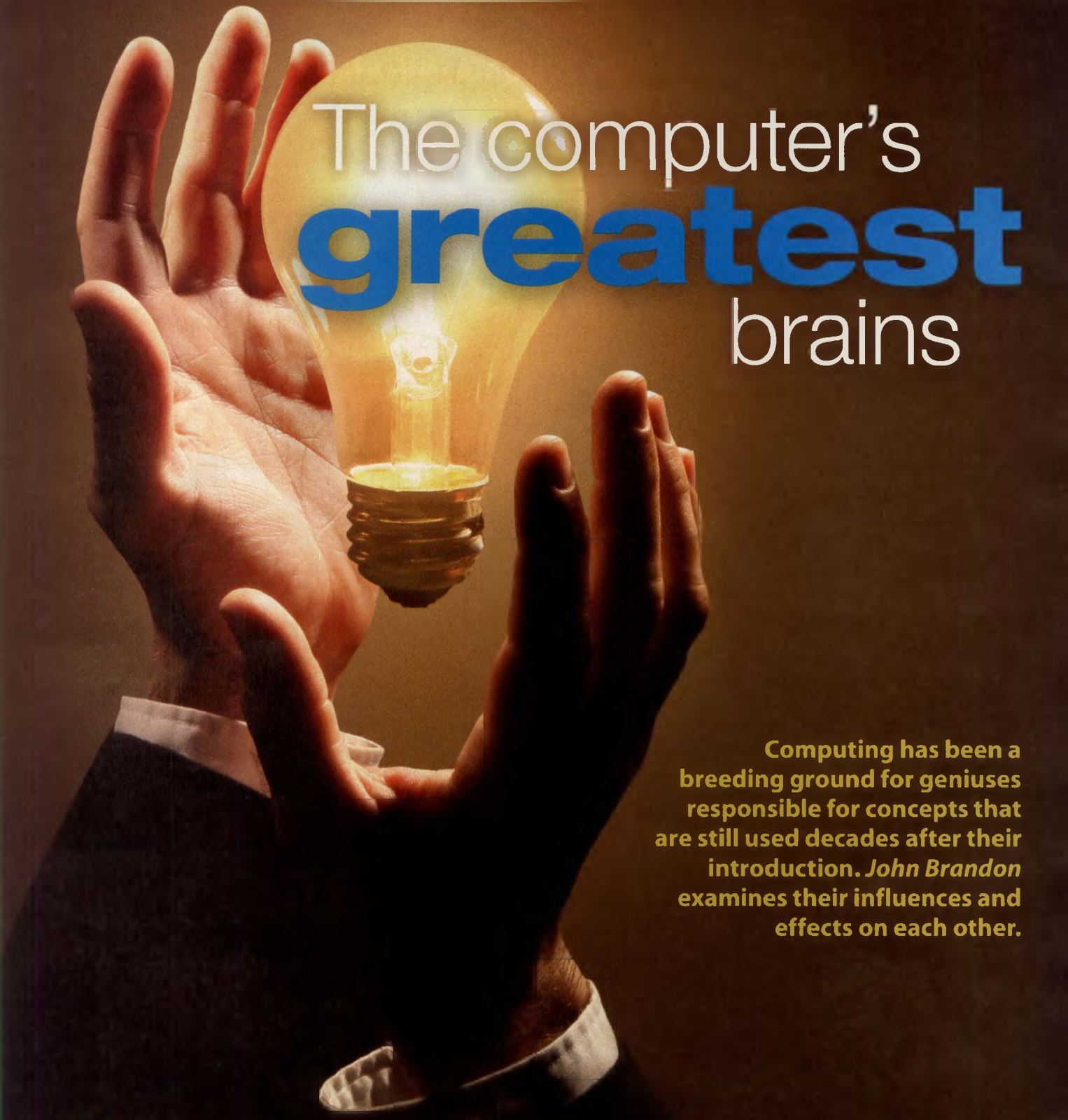


The computer's greatest brains

Computing has been a breeding ground for geniuses responsible for concepts that are still used decades after their introduction. *John Brandon* examines their influences and effects on each other.

Computer technology is all around us: the mobile phone you carry is a mass of integrated circuits and an LCD display; a light and powerful Toshiba laptop in your bag or the Dell Dimension under your desk uses a state-of-the-art processor with millions of transistors; and the flash memory in your digital camera can hold gigabytes of data on a chip no bigger than your little fingernail. At times, it all seems like a happy accident, as though technology just appeared one day, fully formed to aid us in our daily endeavours. Some have argued that the 1947 crash-landing of an alien spacecraft at Roswell led to leaps in our technological developments. The truth is that a group of geniuses fed off each other's ideas and designs to invent new technologies, bringing us the computing revolution and much more. Just about every computing product started life as the brainchild of one inventor who had the foresight and intellect to visualise something new. Our 'genius tree' identifies the most famous computer visionaries of all time — those who made major contributions to the technological field by creating operating systems, storage devices, programming languages and portable gadgets — and show how they relate to the great hive mind that gave us today's performance PC.

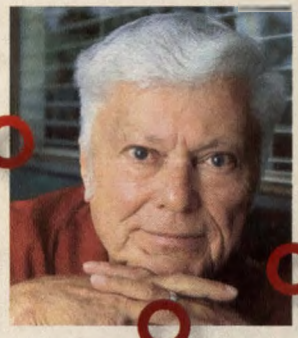
storage

1956 FIRST HARD DISK, Reynold Johnson

Now regarded as the inventor of the hard disk, Reynold Johnson was employed by IBM for most of his working life. In 1956, he invented the RAMAC (Random Access Method of Accounting Control) drive, which used magnetic media instead of the more common cylinders for holding data. The drive weighed one ton and used 50 24in magnetic disks rotating at 1,200rpm with two read-write heads.

1972 FIRST FLOPPY DISK, Alan Shugart

Alan Shugart and a group of engineers invented the floppy disk at IBM in 1972, envisioning a world where the computer and its data lived on outside the corporate world. His disc measured 8in and was coated with a magnetic iron oxide material. Shugart also founded Seagate in 1979.



1978 RAID, Norman Ken Ouchi

In 1978, an IBM engineer named Norman Ken Ouchi invented a concept called Redundant Arrays of Inexpensive Disks, or RAID, which used multiple disks for storage. Disk mirroring and parity techniques helped ensure that data would remain safe even if one drive failed.

1979 SCSI, Larry Boucher

While working at Shugart Associates — the research and development firm founded by Alan Shugart — Boucher invented a way for hard disks to connect faster to PCs and servers, using the Small Computer System Interface or SCSI.

1981 FLASH MEMORY, Fujio Masuoka

Intel is widely (but wrongly) credited with inventing flash memory. Instead, it was a lone engineer named Fujio Masuoka, who worked at Toshiba and is now a professor at Tohoku University in Sendai, Japan. Flash stores data in an array of floating gate transistors in a non-volatile method that works quickly and without the need for an ongoing power connection, and is considered the successor to magnetic storage.

to the PC p 74

mobile phones

1973 FIRST MOBILE PHONE, Martin Cooper

In the early 1970s, phones were still tethered to the walls of our homes and offices. There were no portable phones except for rare models found in cars. Martin Cooper, while working at Motorola, developed the first mobile phone, which weighed 850gm.

2007 IPHONE, Jonathan Ive

Jonathan Ive is the 'rock star' designer at Apple who, along with Steve Jobs, created the iPhone. He is a pioneer in the design field because his products have a seemingly simplistic veneer, yet hide an underlying power. The iPhone's sleek casing conceals a very powerful device.

1997 FIRST CAMERAPHONE, Philippe Kahn

In 1997, Philippe Kahn, who also started Borland Corporation, invented a way to take a picture with a digital camera and transmit it over a mobile phone. He created a software program and soldered together the hardware to make the first of the now ubiquitous cameraphones.

2001 FIRST SMARTPHONE, Gary Koerper

Citing one person as the inventor of the smartphone is hard, since defining this gadget is also difficult — some are glorified mobile phones while others match laptops. Gary Koerper invented a 'smartphone' (with features that mirrored those on a PDA) in 2001 — and it's considered the precursor to today's models.

The computer's greatest brains

from storage p 73

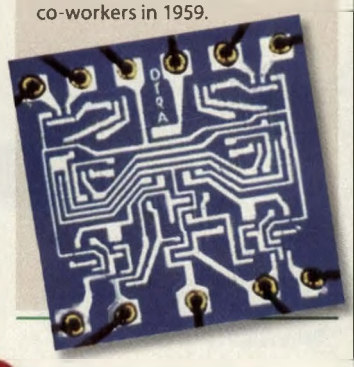
the PC

1842 ANALYTICAL MACHINE, Charles Babbage

The English mathematician and philosopher invented the 'difference machine' in 1822, which could solve preset mathematical problems. But the successor came in 1842, and used punch cards and an 'input and output' system to solve calculations, essentially forming the basis of the modern computer.

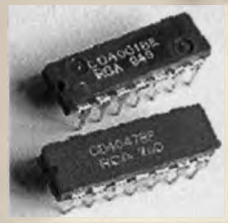
1958 FIRST INTEGRATED CIRCUIT, Jack St. Clair Kilby

The first integrated circuit consisted of just one transistor and a few related components on a piece of germanium: a metallic compound that looks like diamond. Texas Instruments engineer Jack Kilby created the integrated circuit with just a handful of co-workers in 1959.



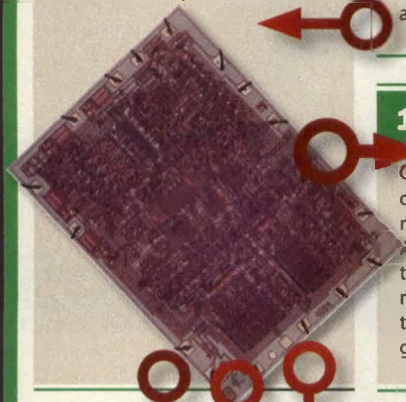
1963 CMOS, Frank Wanlass

Complementary metal oxide semiconductor (CMOS) is the chip of computer memory on your PC used for storing the date, time and system information. Frank Wanlass invented the technology while working at Fairchild Semiconductor. It was first adopted for use in watches and cameras, and then computers.



1971 INTEL 4004, Ted Hoff

Intel luminary Ted Hoff is responsible for creating the first microprocessor. He originally developed the Intel 4004 for use in a desktop calculator. The chip had only 2,300 transistors and measured 10,000 nanometers across, compared to the 45-nanometer size of modern microprocessors.



1976 APPLE 1, Steve Jobs & Steve Wozniak

Generally seen as the first personal computer to be mass-assembled (but not necessarily the first computer), the Apple 1 was a self-contained computer that needed just a keyboard and TV monitor. Steve Wozniak invented the Apple 1 and sold 200 from his garage, with help from Jobs.

2007 IPHONE, Jonathan Ive

SEE PAGE 73

1981 THE LAPTOP, Adam Osborne

Adam Osborne invented the Osborne 1 portable computer in 1981. It weighed 10.66kg and had a 5in monochrome monitor.

1985 MS-DOS & WINDOWS, Bill Gates

Bill Gates and Microsoft marketed MS-DOS in 1981 as the only disk operating system that could work with any personal computer, not just the IBM PC for which it was designed. The command line interface lives on in Windows Vista as the CMD program, and in Windows Server 2008 as PowerShell. In 1985, Gates released version 1.0 of Windows, a shell application that ran from the command line in MS-DOS.

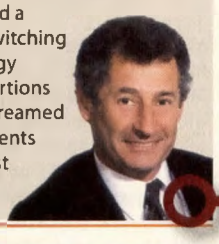
1991 LINUX, Linus Torvalds

Although the importance of his contribution to Linux has been debated in recent years (mostly due to the sheer number of people involved in making the original Linux), Linus Torvalds is widely credited with creating the first Linux kernel. Little of the original code is used in modern Linux distributions, however.

internet

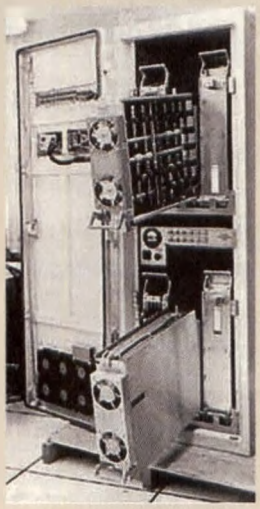
1961 PACKET-SWITCHING TECHNOLOGY, Leonard Kleinrock

Long before the internet came into prominence in the early 1990s, Leonard Kleinrock developed a packet-switching technology where portions of data streamed in increments over a vast network.



1965 ARPNET, Charles Herzfeld

The US government created ARPAnet (Advanced Research Projects Agency) as an indestructible 'network of networks that could withstand even a nuclear attack', due to how multiple servers were scattered in various geographic locations. The director of the project that led to the eventual transition to a public internet was Charles Herzfeld, who has since downplayed the military aspect and says ARPAnet was designed as a way to link computers at universities to aid research. Still, that certainly made ARPAnet the 'tube' that helped move the 'water', even though the water did involve secret government research. ARPAnet was also used as the first network for email, FTP, remote access and even instant messaging.



1990 HTML, Tim Berners-Lee

The language that web programmers learn first in college — Hypertext Mark-Up Language or HTML — is the creation of Tim Berners-Lee, an Oxford University graduate and former researcher with the European Particle Physics Laboratory at CERN. Now a knight, he also developed the original URL, HTPP and HTML specs.

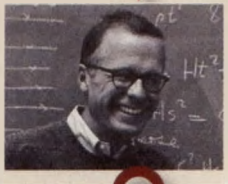
program languages

1952 FIRST COMPILER, Grace Hopper

Programmers can trace the roots of their profession back to Grace Hopper, who invented the first compiler in 1952 while serving with the US Navy. She helped create such fundamentals as subroutines, formula translation and code optimisation. Her main goal in creating the compiler was to relieve mathematicians of the chore of translating subroutines for specific computers.

1954 FORTRAN, John Backus

Before John Backus — an IBM team leader in the 1950s — there was no simplified programming language that used real English commands to help programmers create applications. FORTRAN (short for Formula Translator) was the first.



1979 C++, Bjarne Stroustrup

In 1979, the concept of object-oriented computing, which uses a modular approach to help simplify programming, was still in its infancy. Bjarne Stroustrup developed C++ while at Cambridge University in 1979 and is now a professor at Texas A&M University.

1993 RUBY, Yukihiro Matsumoto

As an 'interpreted scripting language' designed for the web, Ruby — developed by Yukihiro Matsumoto in 1993 — puts all the power of a desktop application into the hands of web programmers, using easy-to-understand syntax commands.

1987 PERL, Larry Wall

Larry Wall invented PERL (Practical Extraction and Report Language) while working at Unisys, mostly because other scripting languages such as Awk and Python were not adequate for string processing. The language — used even at commercial sites such as Amazon.com — is what holds web pages together, and helped champion the open source market by encouraging programmers to experiment.

other geniuses

1868 KEYBOARD, Christopher Sholes

Invented the first QWERTY typewriter, which led to the first PC keyboard.

1964 THE MOUSE, Douglas Engelbart

Created the first hands-moveable input device — a wooden box and two wheels.

1973 ETHERNET, Robert Metcalfe

Invented the first wired network to link multiple computers on nodes.

Essential applications

Every distribution has its own selection of essential applications — here is ours. By *Ashton Mills*.

While Ubuntu is the most popular desktop distribution, and you'll see it covered frequently here, where possible I'll also cover other distributions, as with last month's tweaks. This month, a selection of must-have applications for any new desktop Linux install, tailored by preference of course. So, while you will be able to find some of these using Synaptic in Ubuntu, you should also be able to find them in your software archives for Fedora, Gentoo and others as well. And if not, remember binaries are almost always available from the homepage of these selected apps.

WHAT EVERY NEW INSTALL NEEDS

Last month we covered some nice tweaks for a brand-new Linux install, and the month before that the range of popular and easy-to-use distributions you might choose for a new desktop. Naturally, however, no operating system is worth its salt without the applications you want to run. Most Linux distributions bundle the core applications such as OpenOffice and Firefox, but there are plenty of others out there you may not be aware of and, once you've used them, can't live without. Here's a good selection of applications I use for every new Linux install — perhaps you'll find some gems for yourself as well.

1 TILDA

http://tilda.sourceforge.net

Inevitably you'll use the command line in Linux, but why settle for Gnome Terminal or Konsole when you can have something as handy as Tilda? Named because of its drop-down emulation of consoles from games like Quake, Tilda allows you to pop up a command line at the touch of a button without ever going near your mouse, which is inevitably quicker. It can be configured to slide in and hide away on part of your screen, or occupy all of it. It's one of those simple applications that, once you use, you'll never go back to anything else, so if you're a command line junkie (hands up, you know who you are), give it a go.

2 PIDGIN

www.pidgin.im

Formerely GAIM, Pidgin is the de facto IM for Linux, although Kopete for KDE comes very close. Handling MSN, Yahoo!, ICQ, AIM, Gadu-Gadu and even IRC, it's simply brilliant as a one-stop shop for all your IM needs. A range of swank plug-ins (like Mouse Gestures and Psychic Mode) make it even easier to use and tailor to your style. Kopete for KDE comes very close and obviously integrates well into the KDE desktop, but Pidgin is without doubt one of the darlings of a Linux desktop.

3 AMAROK

http://amarok.kde.org

What is a world without music? While there are some competitive GTK+-based players and managers, the KDE-driven Amarok is still king and is a superb combination of music manager, player, internet radio, lyrics, iPod integration and much more. Every new Linux install needs Amarok, and unfortunately this isn't the default with many distributions. With taskbar integration, it slots in well with both KDE and Gnome desktops.

4 AUTOMATIX

www.getautomatix.com

While it only applies to Debian, Ubuntu and Mepis, it's an essential tool if you use these distributions. Automatix makes it easy to install a range of popular applications that frequently aren't bundled in distributions, as well as making it a snap to enable DVD and MP3 playback support for distributions that don't bundle the required files due to licensing issues. This applies especially to Ubuntu. It's as simple as this: if you use Ubuntu, then you just need Automatix.

5 MIDNIGHT COMMANDER

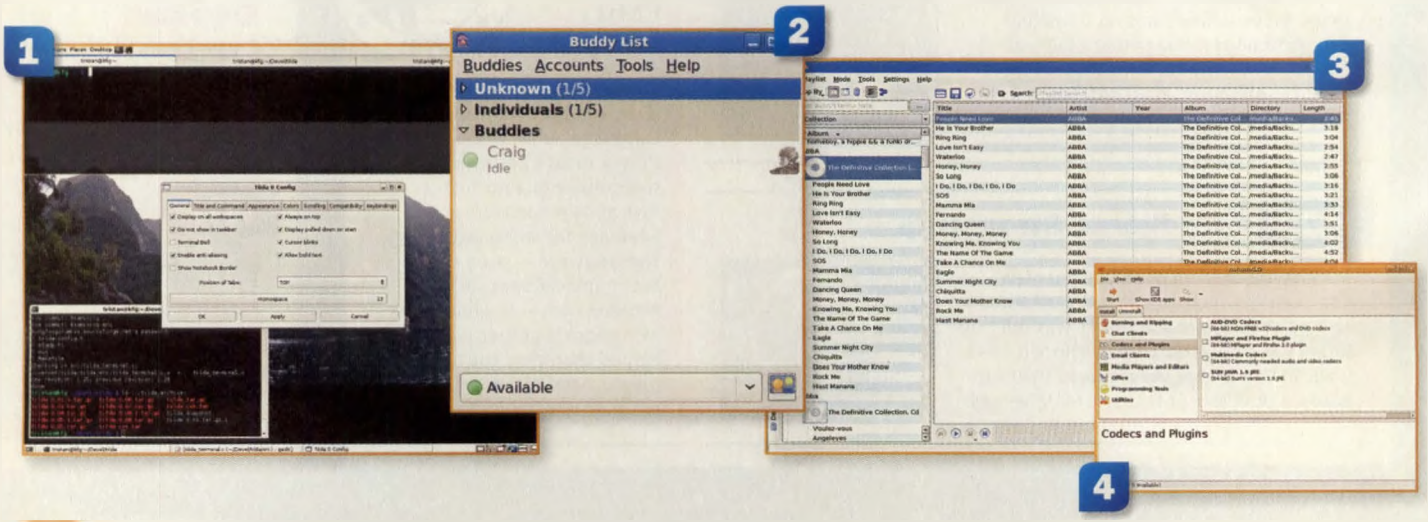
www.ibiblio.org/mc

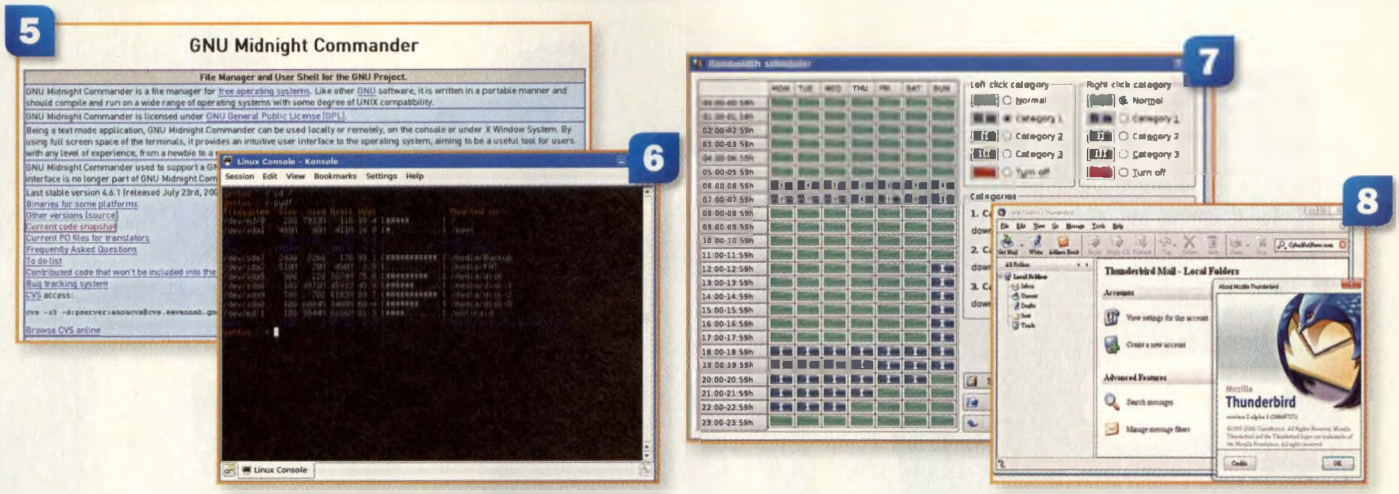
Maybe it's just an overthrow from the XTreeGold days, but Midnight Commander is one of the simplest and quickest ways to manage files on your system. Yes, it's console-based — get out of that GUI for a moment — because you can do in a few taps with MC what would take longer with multiple Nautilus windows and mouse dragging. Additionally, it can search for and within files, seamlessly integrate network mounts, and work within archives. Give it a go if you don't already use it.

6 PYDF

http://kassiopeia.juls.savba.sk/~garabik/software/pydf

It's hard to choose one of the many command line tools to highlight here, but I'll go with pydf for simplicity and style. If you use the command line frequently, and you like using the 'df' (diskfree) command to see available space on your drives and mounts, pydf simply takes it to the next level with colour coding and usage bars. Make an alias for it to the df command with: *alias df='pydf'*. Requires python.





7 KTORRENT
http://ktorrent.org

The definitive standard for torrenting is the cross-platform Azureus, though under Windows uTorrent is just as popular. For Linux, there are less native options, but the best is probably ktorrent, a KDE-based torrent client. While Azureus does work just fine under Linux, it can be bulky and slow, not to mention futzing around with Java. As a native client, ktorrent is fast and integrates well with the KDE or Gnome desktop, and has almost all the features Azureus uses including encryption, DHT support, a plug-in system and some unique features of its own.

8 THUNDERBIRD
www.mozilla.com/thunderbird

Well, Firefox is pretty much the standard, don't forget Thunderbird for email and, although still early in development, Sunbird for calendaring. Gnome-based distributions generally standardise on Evolution for email, but this can be a bit bulky for some, and so here Thunderbird is an excellent alternative, and easily one of the best email clients for Linux. Under KDE, KMail is actually remarkably good as well.

NATURALLY, NO OPERATING SYSTEM IS WORTH ITS SALT WITHOUT THE APPLICATIONS YOU WANT TO RUN

9 MPLAYER
www.mplayerhq.hu

Most distributions will come with either Mplayer or xine, both of which are superb. However, front ends like Totem are frequently used and are, for want of a better phrase, not the best. And between Xine and Mplayer, the latter has an easier default front end. Always ensure you have the latest Mplayer installed (and, if you want to cover all bases, xine as well) and if you're using Debian or Ubuntu, Automatix can do this for you.

10 GTKPOD
www.gtkpod.org

While Amarok also supports iPods, for a standalone iPod manager you can't go past gtkpod. A simple and clean interface allows you to manage your music library and keep it in sync with an iPod, as well as perform basic file-checking maintenance. It's no iTunes replacement, but it does all the necessary tasks.

11 K3B
www.k3b.org

While once XCDRoast was the definitive CD and DVD burning application, much prettier and user-friendly equivalents have evolved. It's a hard choice between GnomeBaker and K3B, but K3B is just that little bit easier to use. Everything you need — from copying CD and DVDs to ripping, creating and burning ISOs, and even allowing overburning — is included, as well as plug-ins for Ogg, Flac, ffmpeg, Lame, and more for ripping to different formats.

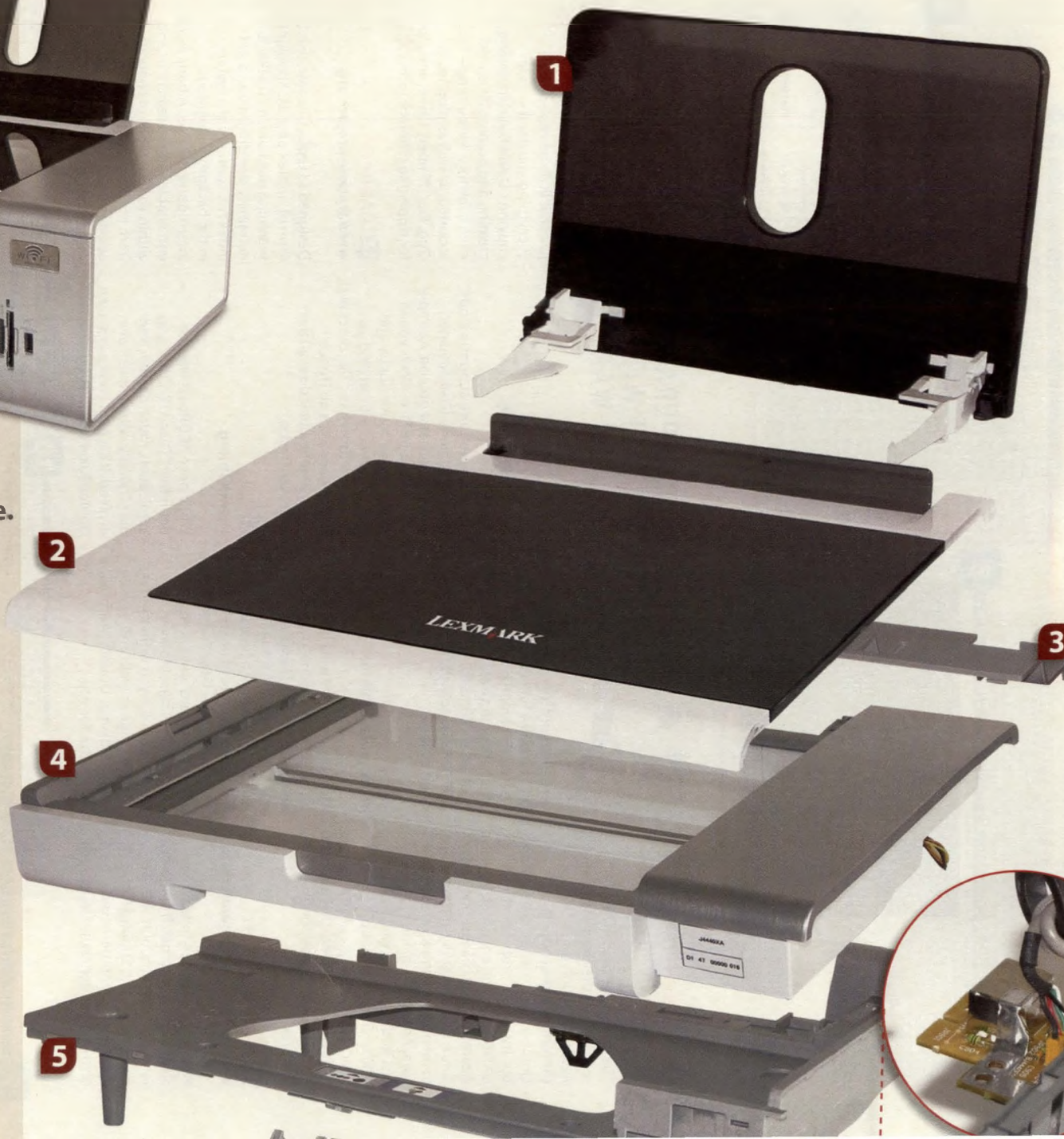
12 TRACKER
www.tracker-project.org

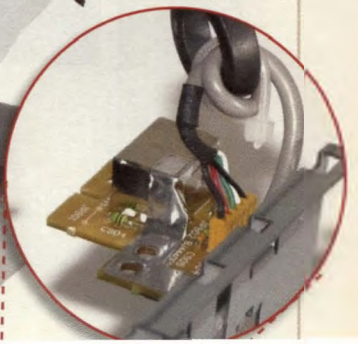
Designed to replace Beagle, itself a form of Apple's popular Spotlight searching mechanism, Tracker is extremely user-friendly and will index the contents of a system in the background without interrupting the user. A basic front end enables you to search for and within various types of content, from file names to music, videos, IM conversations and emails, all from within the one tool.

This month, we're exploding the Lexmark X4550 wireless all-in-one.

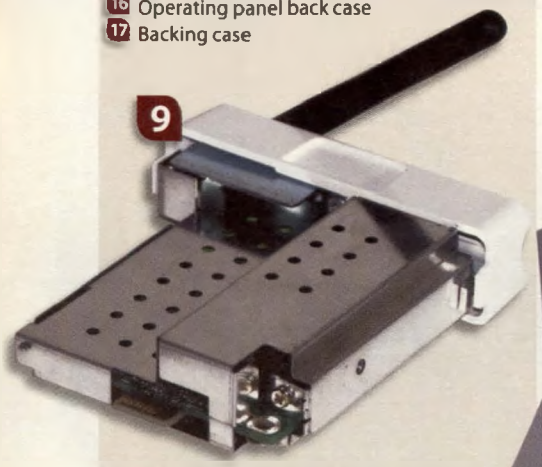
Compatible with PC or Mac, the Lexmark X4550 Wireless All-in-One is built for people who need the functionality of a printer, scanner and copier at home. It is the most affordable three-in-one inkjet printer available in Australia with built-in wireless capability. Lexmark says the X4550 is also easy to set up and is designed to allow people to work seamlessly from any location in their home or office, while delivering professional quality text and photos. With print speeds of up to 26 pages per minute (ppm) black and 18 ppm colour, the Lexmark X4550 is aimed at productivity-minded professionals.

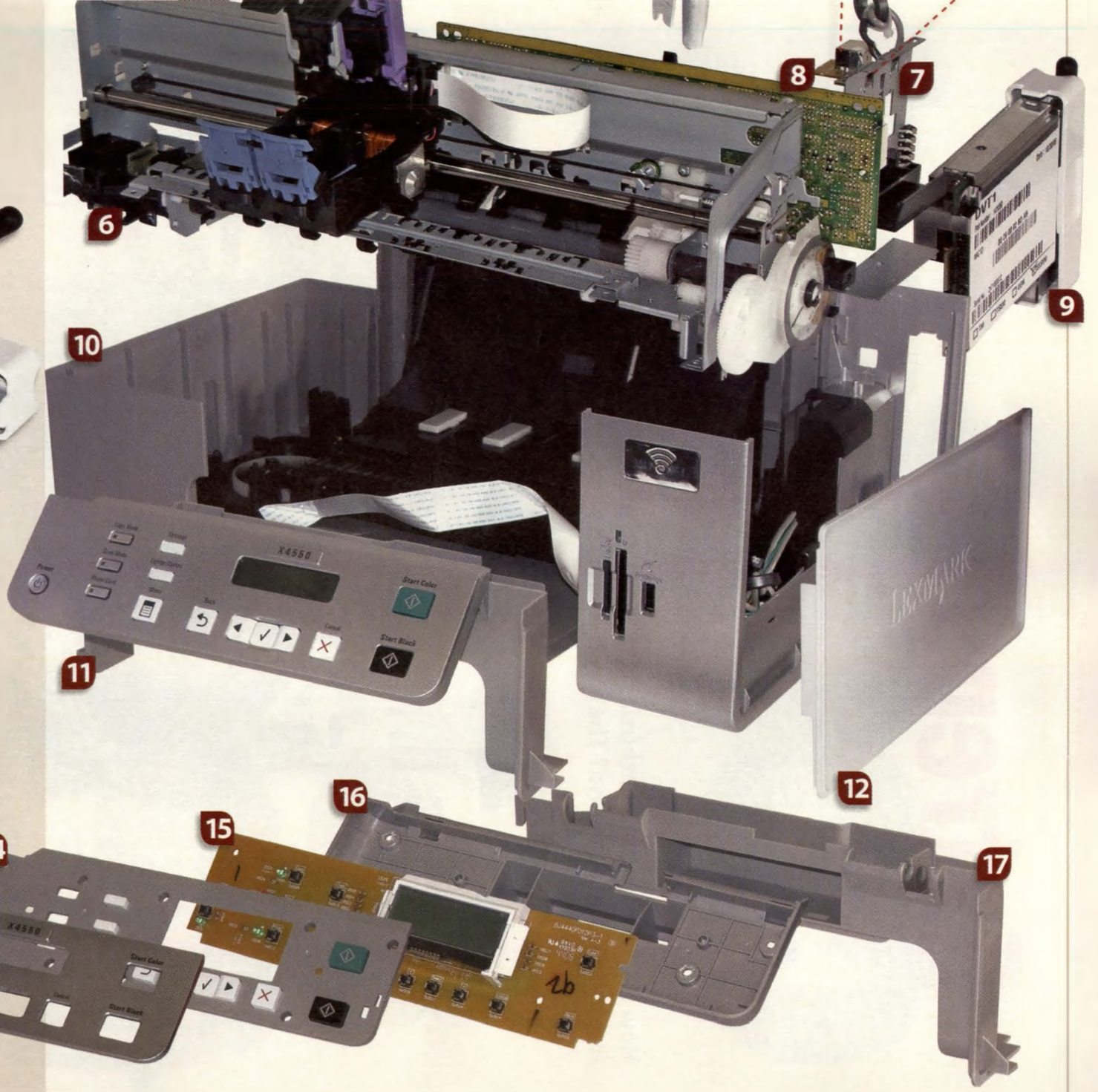
1. Paper support
2. Scanner top cover
3. Cable cover
4. Scanner assembly
5. Mid-frame cover
6. Print engine / cartridge carrier
7. USB port / board
8. System board
9. Internal wireless network adapter (INA)





10 Printer universal base
11 Operating panel
12 Right-side (engraved) printer panel
13 Operating panel front case (brushed metallic)
14 Operating panel button insert
15 Operating panel board
16 Operating panel back case
17 Backing case

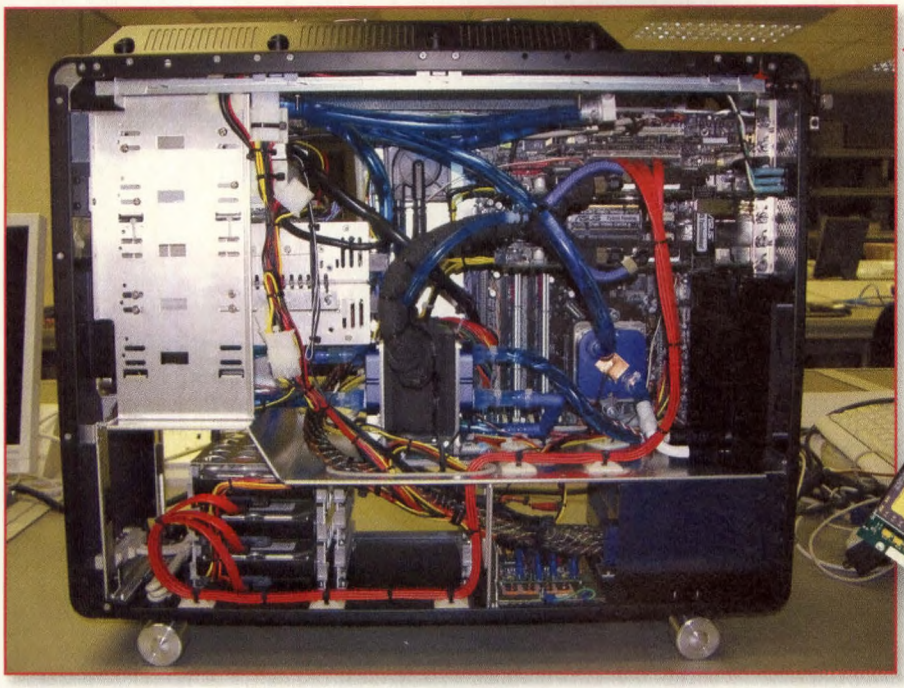




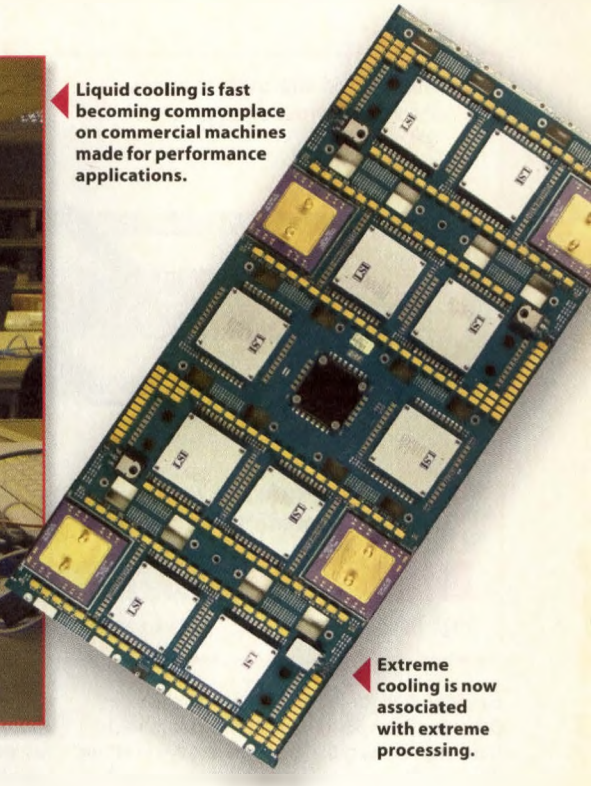
The wireless access built into the Lexmark X4550 means the three-in-one connects wirelessly to a home network.

Extreme cooling technologies

How do overclocking enthusiasts manage to push processors to 50 per cent faster frequencies and beyond? The key is in the cooling, explains *James Morris*.



Liquid cooling is fast becoming commonplace on commercial machines made for performance applications.



Extreme cooling is now associated with extreme processing.

Mainstream computing may have shifted from brute clock speed to multiple cores processing in parallel, but running at faster frequencies is still a bonus. The problem is that as clock speeds increase, the amount of heat produced becomes unmanageable. This has put a ceiling on how fast you can run your processor, at least if you plan on using cheap air cooling to keep things at appropriate operating levels.

If you have the money, though, it's possible to push current processors to almost twice their stock clock speed. We explain how you can get a 3GHz processor to run at 5GHz and beyond.

Once, PC processors merely required a small assembly of metal fins to keep them cool. But that was when they were running up to a few hundred MHz. The key factor is how much heat must be dissipated. Although the way this is expressed has changed over the years, it's usually described as either a typical or as a maximum figure. However, you'll also see a Thermal Design Power (TDP) figure for the last few generations of processors. This is not the absolute maximum heat a processor may produce, but the maximum it will produce when running the most strenuous of everyday apps. So, it's the design target for mainstream cooling solutions.

Until recently, the general trend for required heat dissipation has been approximately in line with clock speed. For example, a 33MHz 386SX consumed less than 2W, and less than 1.5W of that would typically need to be dissipated in the form of heat. Hence, a simple passive heatsink was enough. At that time, though, there were no options for increasing clock speeds unless you were handy with a soldering iron and had the processor schematics to hand.

With the arrival of the Pentium, the typical heat dissipation required was still only a few watts — typically 6.5W, but with a possible maximum of 15.5W. So, a passive heatsink was still possible, although the faster Pentium chips and their competitors did start to use active air cooling. However, overclocking remained a very crude affair. The processor clock speed was dictated by jumpers, which defined the bus speed and multiplier. You could use these to push a Pentium up a class — say from 150MHz to 166MHz by changing from a 30MHz bus to a 33MHz one — but this wasn't always reliable.

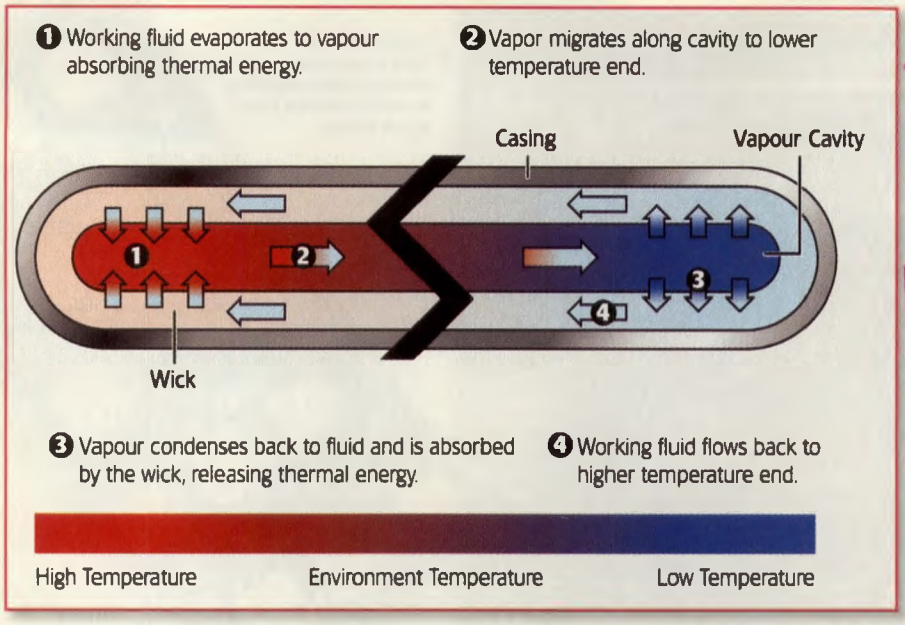
FAN COOLING

It was only when the Pentium II arrived that more aggressive active-cooling methods became a necessity. The first generation of Pentium II (aka. Klamath) ranged from 35W to 43W. However, this actually dropped with the next iteration (Deschutes) despite clock speed increases, because the feature size had reduced from 350nm to 250nm. This is an important

> THE HERO IS THE THERMAL DIODE. . . WHICH SHUTS DOWN THE PROCESSOR BEFORE IT REACHES A DAMAGING TEMPERATURE

FACT FILE!

Because running a processor at a higher frequency necessitates a faster supply of data, overclockers often drop the multiplier and raise the FSB, to minimise the bottleneck from moving data to and from main memory.



As the liquid in a heat-pipe changes phase to a vapour, heat is drawn from the surrounding area to a place where it can be cooled more efficiently.

FACT FILE!

Overclocking with liquid nitrogen is a black art. When the benchmark is finished and the processor load drops, the temperature can also drop too far. If the processor falls below its lowest operating temperature, the system may crash, making saving the results of the benchmark tricky!

consideration for processor frequencies. Dropping from 350nm to 250nm means each transistor is around 30 per cent smaller in either direction, so takes about half the area overall. The result is that less power is required to cycle the transistors at the same rate, allowing faster clock speeds.

The first generation of Pentium III also used the 250nm process, but Coppermine dropped this to 180nm, again halving the area required by each transistor. So although this processor eventually reached 1GHz, its power dissipation requirements weren't actually greater than the original Pentium II. From the outset, however, Pentium 4 broke this tradition, as it was engineered for clock cycles. A significant factor in the possible clock speed of a processor is the complexity of the individual logic gates which make up each stage of the processing pipeline. The material used for these gates places a limit on switching speed, because each gate can only cycle so fast. The fewer gates used for each stage, the faster the stage executes — although it also therefore performs less work, so more stages will be required. For this reason, Pentium 4 used considerably more, but simpler, pipeline stages than Pentium III, allowing much faster clock speeds. In fact, Intel originally talked about the Pentium 4 hitting 10GHz, then muttered something about 25GHz a couple of years prior to canning development, before it even reached 4GHz. However, the 3.8GHz 670 had been pushed to over 7GHz by an extreme overclocker — you can read more about this later (see page 85). AMD's Athlon 64, in contrast, didn't venture greatly beyond the Athlon XP's number of pipeline stages, relying on more efficient design than brute clock speed for its increase in performance.

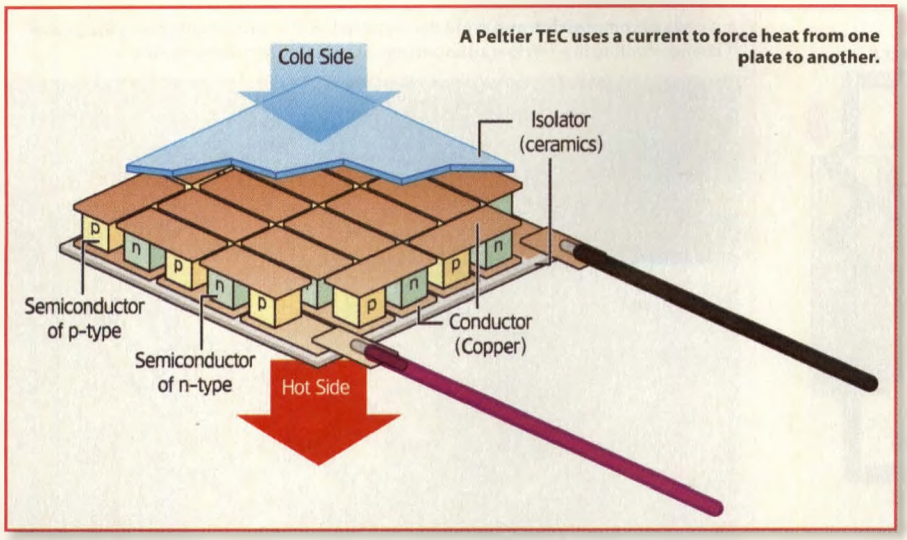
It was around this time that fans and heatsink pin design started to become important. Surface area, heat conductivity and airflow are the primary factors, as more air contact and better flow mean more heat can be drawn out of the system. But you would need a degree in physics to understand why some pin shapes are better than others.

DangerDen's blocks are much sought-after by overclockers for their water-cooling performance.

HEAT PIPES

A technology which has become increasingly important, and is a little easier to comprehend, is the heat-pipe. This is a simple passive phase change system. A pipe of a conductive material such as copper or aluminium is filled with a coolant, which is usually helium, ammonium, ethanol, mercury or even water. However, only a small amount is used, with the remainder of the tube filled with the coolant in vapour form. Grooves on the inside of the heat-pipe, or sintered metal powder, create a capillary action drawing liquid to the heated area in a similar

WATER COOLING CAN KEEP A PROCESSOR 10° COLDER THAN AIR COOLING, SO IT'S A FAVOURITE FOR PCs THAT REMAIN OVERCLOCKED ALL DAY



A Peltier TEC uses a current to force heat from one plate to another.

fashion to a candle wick. It then evaporates, drawing heat away, and escapes to the cooler portion of the pipe where the vapour cools and returns to liquid state. The benefit is that heat is drawn away from the source to a place where it can be cooled more efficiently, using a larger fin array and fan.

Although heat pipes have been used in notebooks for some years to move heat from the cramped interior to vents on the outside edges, they are now becoming more prevalent in desktop systems. Processor heatsinks and even motherboards and graphics cards are using them for the same reason as for notebooks — drawing heat from cramped spaces with poor airflow to more efficient areas for cooling.

LIQUID COOLING

Water cooling operates on a similar ethos, although without using a coolant that changes phase from liquid to vapour. Although relatively new to mainstream PCs, water cooling is hardly a novel technology. It's the most prevalent method of cooling car engines and has had a chequered history with computing as well (see the Supercomputer Cooling box to the immediate right). Quite simply, flowing water is used to move heat from one place to another. The water passes through a plate attached to the heat source — be it processor, Northbridge, graphics card, or even hard disk or memory. The water is heated and then travels onwards to a radiator, again positioned for greatest airflow and cooling. Many designs even place the radiator and associated fans externally to the PC chassis, and Zalman grabbed the headlines a few years ago by creating an entirely passive water-cooling system called the Reserator-1, which is essentially noiseless.

A good water-cooling system can keep a processor at least 10°C colder than air cooling, and so it's a favourite solution for PCs intended to remain overclocked all day. The biggest drawback with water cooling is the efficiency of the transfer from the heat source to the water in the first place. Hence there is a premium on really good water blocks, such as DangerDen's Maze range (**www.dangerden.com**). Beyond that is 'direct die' cooling — where the heat spreader is removed from the processor to reveal the die beneath. The fluid is then passed directly over the die, although great care must be taken to prevent leakage causing short circuiting. The die itself, however, is not susceptible to this.

SOLID-STATE COOLING

Another method, which can be used with air cooling as well as water, is the thermo-electric cooler (TEC) or Peltier device. This takes advantage of a curious feature of physics called the Peltier-Seebeck effect, whereby a thermal differential across dissimilar conductive materials translates directly to an electrical one — and vice-versa. The latter is the phenomenon relevant here. A plate is made of a sandwich of two metals and a lattice of alternating p- and n-type semiconductors, with a voltage applied across the lattice. Heat is then drawn from one plate to the other — the higher the voltage, the greater the cooling. A Peltier module will often consist of multiple plates sandwiched together, working in series to accentuate the cooling effect with one plate cooling the next still further. A TEC can even produce sub-zero temperatures.

However, TECs do have disadvantages. The heat is merely moved away from the processor, not dissipated. So further cooling is required to chill the hot side of the plate (hence the association with water cooling). A TEC also doesn't just move heat from one place to another, it produces heat in relation to the current applied across the plates. So the cold plate may be cooled by 10°C, but the hot plate will be more than 10°C hotter in the process. As a result, the secondary water cooling needs to be more efficient, although the end result will be a cooler processor than with a passive block.

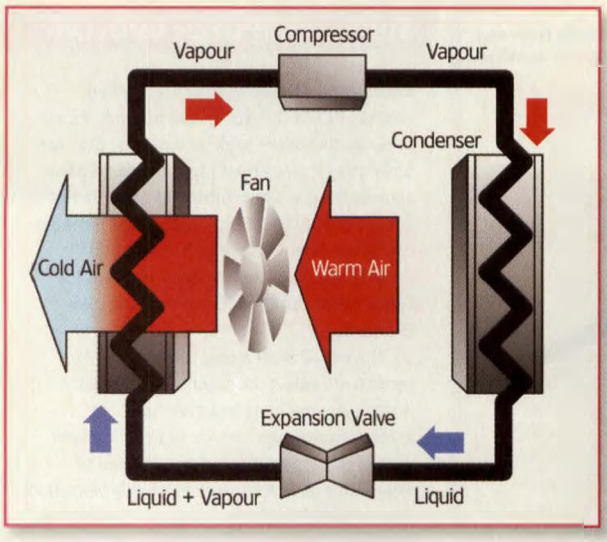
SUPERCOMPUTER COOLING

Although liquid cooling has only reached desktop PCs in the last couple of years, its use in computing dates back for decades. Cray has been using it since the Cray-1, the world's first supercomputer, which arrived in 1976. In this case, a copper sheet was sandwiched between two circuit boards laden with processors, drawing heat to pipes on the edge where the Freon-based refrigeration system provided the cooling.

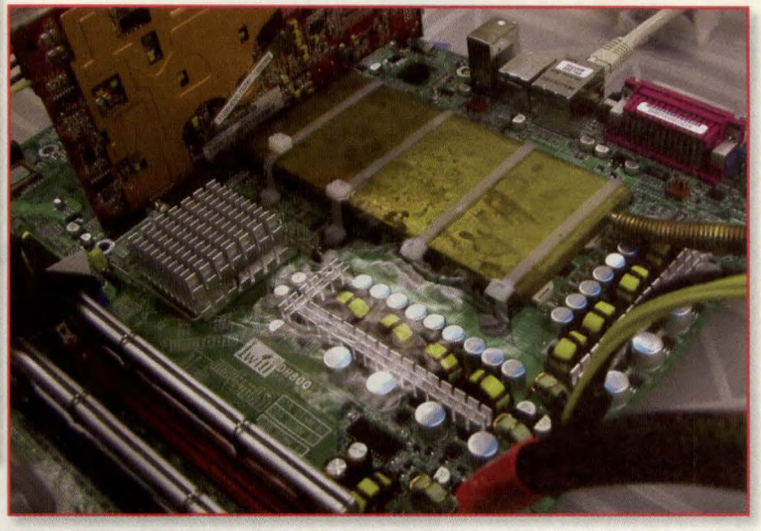
The Cray-2 went a step further in 1985. Instead of cooling the processors indirectly, with the copper plate in-between, direct immersion was used similar to the 'direct die' water cooling described above. Instead of water, Cray used a non-conductive fluorocarbon liquid called FC-77, which could be flowed over the entire circuit board without fear of electrical short circuit. The FC-77 was pumped around a circuit to separate heat exchangers, where it was itself cooled by chilled water.

Cray isn't the only high-end computer company to use liquid cooling. IBM has been water-cooling its mainframes since the mid-1960s. The S/360 was water-cooled, and water-cooled options have been available right up until the Enterprise System/9000. Although liquid cooling has fallen out of favour since the Enterprise System/9000 was discontinued, it has started making a comeback in high-density rackmount systems such as blade servers. HP released water-cooled products at the beginning of 2006, and IBM is now considering something similar. So it looks like extreme cooling will always go hand in hand with extreme processing, even at the business end of the market.

Liquid cooling may be a fairly recent solution for desktop PCs, but Cray's supercomputers have used it since the '70s.



A cycle of compression and rapid decompression of a refrigerant causes the phase-change cooling in a refrigeration system, as this diagram demonstrates.



Submerging in a non-conductive liquid eliminates condensation risks in refrigeration systems.

As far back as mid-1999, Sander Sassen of Hardware Central (**www. hardwarecentral. com**) used a TEC and water combination to create the first 1GHz Pentium III, although the water system was itself chilled using a tertiary refrigeration system. More recently, workstation builders have demonstrated temperature-controlled TECs with water cooling which pushed an Intel Core 2 Extreme QX6700 to a very stable 3.8GHz from its stock 2.66GHz — impressive considering few have managed to get this processor much past 3.2GHz using the best air cooling available. With four cores and a TDP of 130W, the QX6700 already requires serious cooling at its stock frequencies, leaving little room for overclocking.

REFRIGERATION

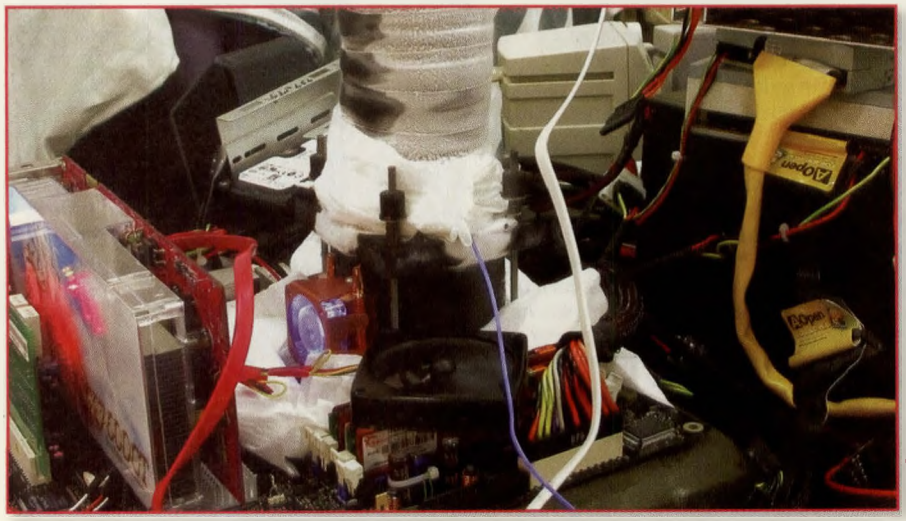
The king of cooling is active refrigeration, aka. 'phase change'. The first commercially shipped use of refrigeration was from Kryotech, which, in one example, took a 600MHz Athlon, cooled it to -40°C, then ran it at 800MHz. However, the Kryotech system was a factory install, as the processor used had to be irreversibly modified prior to installation. It wasn't until Chip-Con brought out its Prometeia, and Asetek its Vapochill, that phase change became a viable user install, although still one for an expert. Refrigeration is not something most people would want to use on a PC for everyday use, either. Prior to firing up the PC, the processor must be cooled to operational temperature, otherwise it won't start up at all due to the processor being set well beyond its normal operating frequency. This can take a few minutes. The fans and compressor can also be noisy.

> OZONE-DEPLETING CFCs MEANT R-12 WAS PHASED OUT. . . R-134A HAS A HIGHER BOILING POINT BUT LESS OZONE IMPACT

Refrigeration works by a process of evaporation, similar to a heat-pipe. When you emerge from the bath or swimming pool, the evaporation of the water from your skin makes you feel colder than you did in the water, even if the water was actually cooler than the ambient air temperature. This is because the water takes some heat from your body to change phase, from liquid to vapour as you dry off. However, boiling points increase with pressure. A refrigeration system compresses a gas so it becomes a liquid, then passes it through an expansion valve so it experiences a sudden drop in pressure. This raises the boiling point so it begins to boil off. But it must take the energy for the phase change from the surrounding area, so it cools its surroundings as it passes back to the compressor in vapour form. A conventional air-cooled radiator is then used to remove any excess heat from the compression process, and the circuit begins again.

EXOTIC FLUOROCARBONS

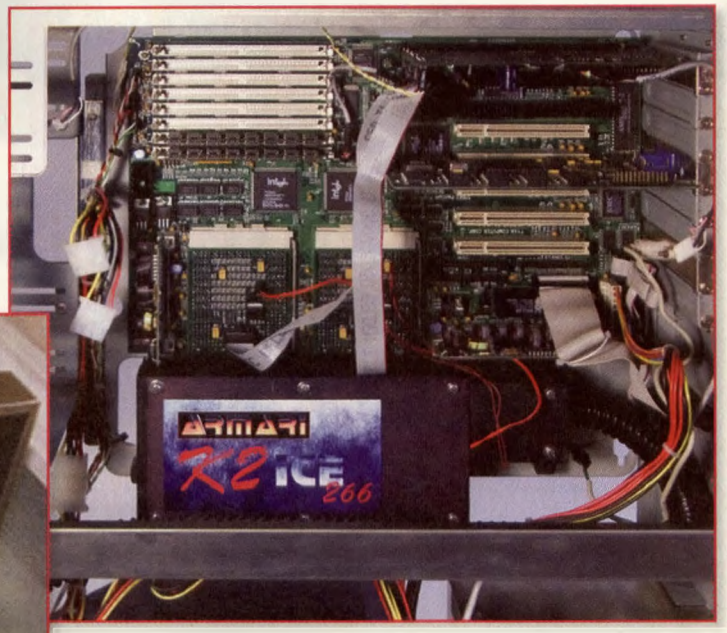
This wouldn't work well with substances that are already a liquid at room temperature, which is why exotic chlorofluorocarbon (CFC) gases such as Freon have historically been used instead. There is now a whole pantheon of refrigerants with R numbers, where R-12 represents Freon, and each has a different boiling point at



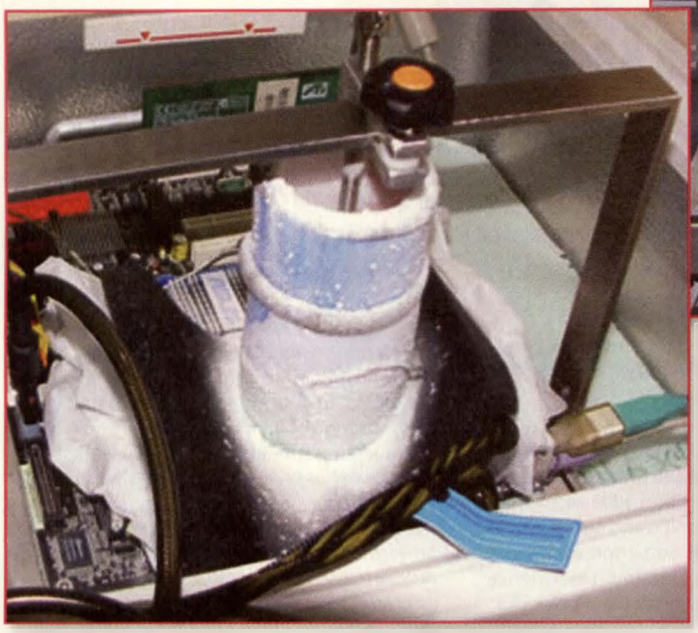
Singaporean Coolaler has achieved the highest recorded frequency for an Intel Core 2 processor — over 5.5GHz using liquid nitrogen.

FACT FILE!

Refrigeration, also known as phase change, relies on exotic compound gases with low boiling points. These are referred to by an R-numbering system, which was originally developed by DuPont.



Armari was an early innovator in refrigeration.



Extreme Cooling Technologies cools systems to the lowest of temperatures, enabling processors to run at higher clock speeds.

standard atmospheric pressure. Freon boils at -30°C, so can be used to reduce temperatures to around this point. However, the ozone-depleting nature of CFCs has meant R-12 was phased out over a decade ago. Now R-134a is more commonly used, which has a slightly higher boiling point of -26°C but far less ozone impact.

For processor overclocking, -26°C is not considered low enough, and 'mainstream' phase change cooling like Extreme Cooling Technologies' (**www.extremecoolingtechnologies.com/**) Prometeia Mach II GT instead opts for R-404a, which boils at -46.4°C. This allows the processor to run at higher clock speeds. For example, the Mach II GT allows a 3.6GHz Intel Pentium 4 660 to run at over 5GHz, or a 2.8GHz Athlon 64 FX-57 at over 3.5GHz.

For the most extreme phase-change overclocking, however, a single refrigeration circuit is not enough. If you peruse the top rankings of world benchmarks, virtually every system achieving the highest scores with phase change will be using a cascade, where multiple refrigeration circuits operate in series. With a cascade, the first circuit is used to cool the next, and so on. Each stage uses a different refrigerant with a successively lower boiling point. The most famous name in PC phase change, Chilly1, has built a three-stage cascade capable of -128°C. Shannon Thomas, from an Extreme Prometeia group in the UK (and sometime holder of PCMark's top score), uses two stages. Shannon's cascade uses R-507 with a boiling point of -47°C in the first loop, and R-23 with a boiling point of -82°C for the second one.

Condensation is another issue with refrigeration, and extreme overclockers have various ways of getting round this. One is to seal off components with waterproofing substance in spray-can form. But a UK-based PC builder, Armari took a novel approach for its PCMark-topping PC by immersing a phase-change system in a non-conductive liquid called IntertX, a brand name for 3M's Fluorinert perfluorocarbon liquid.

There is another step up from refrigeration, but you couldn't possibly consider it for anything but competitive benchmarking: liquid nitrogen. This essentially consists of pouring liquid nitrogen on to a processor using a specially designed pot enclosure, which then cools it to -190°C or lower. Tom's Hardware (**www.tomshardware.com/**) used this method to push a 3.4GHz Pentium 4 to 5.25GHz in December 2003. In August 2005, an unnamed Japanese overclocker used an ARC Pot Revc.12.1xe LN2 liquid nitrogen system to push a 3.8GHz Pentium 4 670 to 7,132.82GHz — that's 88 per cent higher than specified. The Greek overclocker George 'hipro5' Theologou runs a 2.93GHz Intel Core 2 Extreme X6800 at over 5.4GHz using liquid nitrogen, an almost as impressive 84 per cent increase, although again the record for this chip is over 5.5GHz.

VOLTAGE CHANGES

Although these extremes of overclocking wouldn't be possible without extreme cooling systems, the second most important factor is processor voltages. As processor clocks increase, a higher voltage will be required to keep things stable, which is the primary reason why overclocking is highly likely to reduce the operating life of your processor. Most motherboards now have some voltage user configuration in their BIOSs, but the most extreme clock speeds will require modifying the motherboard, or even the processor, to enable the voltages that have become necessary.

And in all this, the unsung hero is the thermal diode, something Intel has been putting on its processors for years, and AMD since the Athlon 64 (although the Athlon MP had some thermal safety measures). A thermal diode shuts down the processor before it reaches a damaging temperature, although it won't prevent the effects of using too high a voltage. Prior to this, processors also 'throttle', reducing performance to counteract overheating. These two features have made overclocking a far less risky activity than it used to be.

Even now that processors are moving away from brute clock speed towards multiple cores, the performance pinnacle will remain with those willing and able to push the frequency envelope. After all, it's not like anybody but a semiconductor company could bolt on a few extra cores. But anyone with the will, the courage, and the right cooling system can take an everyday CPU and turn it into a record-breaking monster. APC

APC readers solve your computing problems

QUESTIONS ANSWERED

OFFICE
86 Best RAM for Excel
86 Manage Outlook data files

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***APC* readers are Australia's single largest group of tech experts. If you have a technical problem, chances are that an *APC* reader can solve it.**

OFFICE

BEST RAM FOR EXCEL

Q Is there a CPU or RAM sweet spot for number-crunching in Excel, or is it simply a matter of fastest possible processor and the most memory? We use Excel 2003 with lots of functions (vlookups, simifs, and arrays) on XP. The PC has 1GB of RAM. Some spreadsheets are a nightmare. Is this a common experience or is it simply related to not having powerful enough hardware?

Craig Purcell

A Manipulating large Excel spreadsheets generally requires large amounts of RAM rather than a superfast processor (though a fast CPU won't hurt). As long as you've got a decent processor (P4 3.0GHz or better), your system will handle large spreadsheets with complex macros much better with a RAM upgrade. The first thing to do is change your OS to 64-bit Vista or XP — a 32-bit system can't handle more than 3GB of RAM. A good RAM sweet spot would be 2 x 2 gigabyte sticks of PC6400 DDR2 RAM. Check that your motherboard accepts this type of RAM and that it can operate in a dual-channel mode (this will double your memory bandwidth and make quite a difference). Adding a dedicated graphics card will also free up system memory — even an ultra low-end card will suffice.

Another performance boost would be to move your pagefile (virtual memory) to an independent (non-OS) hard disk — this can be done under the System Properties menu of XP. You could also experiment with a RAID 0 configuration of hard disks to store and work off your large spreadsheets. RAID 0 works better with large files when the stripe size is set fairly large.

Otherwise, simply make sure your PC is virus/adware/malware/dust-free and perform regular disk defrags with a quality defrag program.

BY EINAR ODDSSON
Einar runs an Aussie team in the Folding@home computing project.
www.stanford.edu

OFFICE

MANAGE OUTLOOK DATA FILES

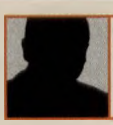
Q My Outlook data file is currently in excess of 2GB and is starting to take a long time to back up. I'm concerned that my data may not be safe. How large can an Outlook data file be?

Timothy Steely

A Microsoft Outlook can be used in a collaborative Exchange (corporate) environment or as a tool for downloading email. When used in standalone mode, Outlook stores email in a PST (Personal Storage) file. The maximum size for this file is 2GB for Outlook 2000 and 20GB when using Outlook 2003. This file size limit is set by the MaxLargeFileSize

WHAT'S WITH THE READER BOX?

APC will give readers whose answer is highlighted a small promotion box in which they can promote their business with a mission statement or slogan — and a URL or phone number.



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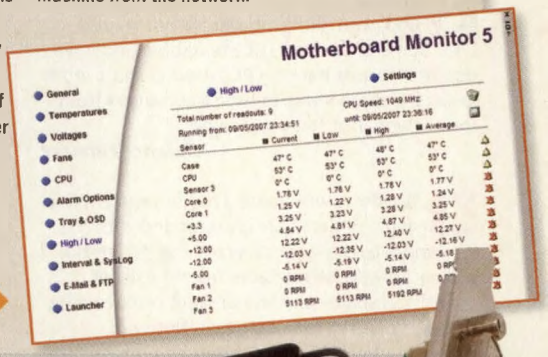
PSU POWER DROPS

THE REASON FOR MANY UNEXPECTED HARDWARE PROBLEMS

PC power supply units (PSUs) supply power to peripherals and components inside your PC. The PSU is designed to supply reliable power to a fixed number of devices, each provided for with unique connections: 15-pin SATA connectors providing 3.3v, 5v and 12v for SATA HDD; four-pin 'P4' connectors for additional supply to the mainboard and peripherals; four-pin Molex connectors providing 12v and 5v supply for hard drives, fans, DVD writers and the like; and 20-pin motherboard connectors providing 3.3v, 5v and 12v for mainboards. These connections can be tapped using easily available splitters to divert power to additional fans or devices. Additional connectors can be created from single connections with illuminated Molex blocks. Every USB device plugged into the PC case will also demand an additional 5v from the PSU. All these additional demands for power can raise the PSU supply above design specifications to the point where the PSU can blink out or fail. PSU brownout (loss of rated power on one or more buses) is advance warning that your PSU is working too hard. Symptoms include keyboard lockups, problems with graphics cards and system-freezing or rebooting (particularly during starting as demands on the PSU increase by up to 50 per cent at boot time, upping the chance of brownouts at this point). Bear in mind that computer power supplies are typically designed with a MTBF (mean time before failure) of around 100,000 hours (11.4 years), although varying grades of components, energy effciency and operating environments can reduce this theoretical figure dramatically. Servers and other critical devices should be provided with redundant PSUs that can be replaced without having to disconnect the machine from the network.



Use a BIOS sensor utility such as this one to keep an eye on your PSU.

Intel's P35: is it worth waiting for the G35?

registry entry: (HLKM\Software\Policies\Microsoft\Office\11.0\ Outlook\PST).

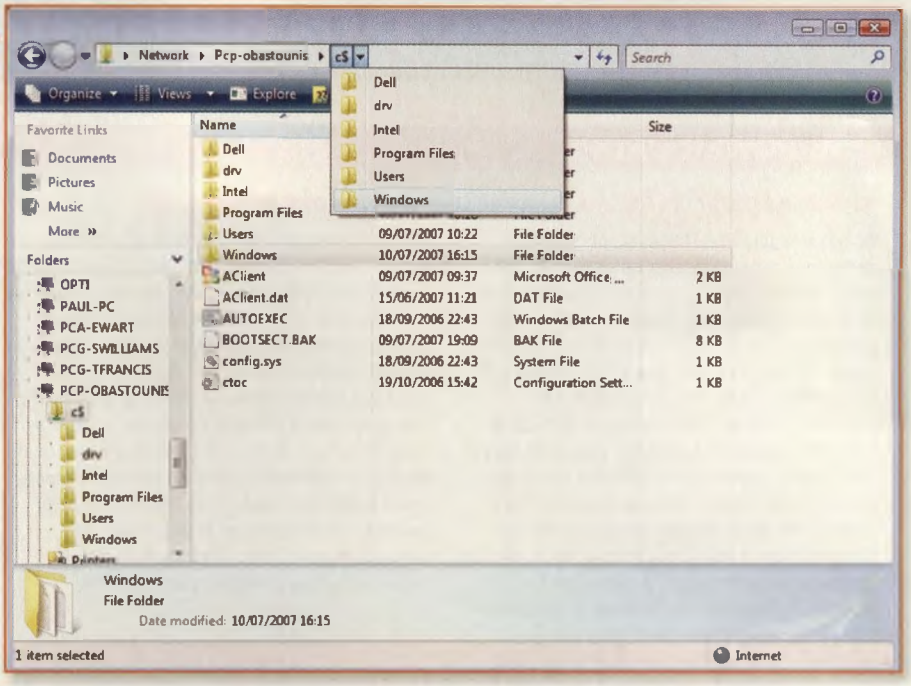
This can be changed by editing the string value of the entry. The default value of 0x00005000 produces a maximum .pst file size of 20GB. Another registry entry — MaxWarnLargeFileSize — defines the limit of a .pst file, before which Outlook will produce a warning. This is set by default to 0x00004C00 or 19GB. If the size of the .pst file exceeds the limits set in the registry, Outlook will warn first, then produce an error when an attempt is made to write to it. Outlook stores all data created by services such as email, calendar and contacts in the default data store. If this becomes damaged, the user can lose years of valuable information. Several strategies can be formed to minimise this risk. A group policy can be used to force the file size down using the MaxLargeFileSize registry value and then split the risk over several files. Or, you can use the Microsoft Outlook Backup tool (free download from Microsoft) to create backup copies of the .pst file when Outlook is closed. Don't store the .pst on a network share, though. Outlook constantly indexes and refers to the .pst file and this can result in it corrupting the .pst when used over a network.

HARDWARE

WAITING FOR INTEL'S G35

Q I am planning to build my first system and I have been waiting patiently for the Intel G35 chipset mainboards to come out. This is because I play my PS3 for games, and when a massive title comes along next year (eg. StarCraft II), I can then splash out and upgrade to a high-end graphics card. Can you tell me when these boards will be released? Should I just get a P35 board and an 8600GT now and forget about G35?

Tim Jones



Hiding a whole PC: hidden shares can be either an aid to productivity or a security problem.

A G35 boards are available now from Intel in Australia. You should totally buy a P35 and 8600GT and ignore the integrated graphics option.

NETWORKING

HIDING A WHOLE PC

Q We run a mixed bag of Windows Vista, XP and even '98 computers in our shared LAN. Some of our users like to dabble and have got into trouble hacking PCs used to share work folders. Is there a way to hide a computer from the network but still share folders?

Clarence Fillmore

A Windows will create a hidden share if the name of the share is appended with the '$' symbol as the last character. The '$' symbol will remove the share name from the list of advertised shares and will prevent discovery by casual browsing, for instance in Network Neighbourhood. Group Policies can be used to remove users' ability to browse a network, but this requires that a 2003 server is present in a domain environment. Furthermore, some network users may simply be able to guess at some hidden share names; for instance, Windows XP assigns a default sharename (C$, D$ and so on) to each partition as it's created. In this way, hidden shares on any host that advertises its name can easily be compromised. In a purely Windows environment, a hidden share is effectively invisible, but this well-known technique won't stop a determined dabbler. For, once inside the network, it's a simple matter of booting with a live Linux CD (Ubuntu, Knoppix or Puppy) and using 'smbclient -l //myserverpc' from the command line to reveal the hidden shares. Disabling XP broadcasting PC names in this situation becomes doubly important. The command used to do this is part of the net command instructions: 'net config server / hidden: yes'. Execute this from the command line at the server or PC and your server will disappear from Network Neighbourhood. Existing connections will not be affected and the server will respond to incoming requests in the normal way.

MULTIMEDIA

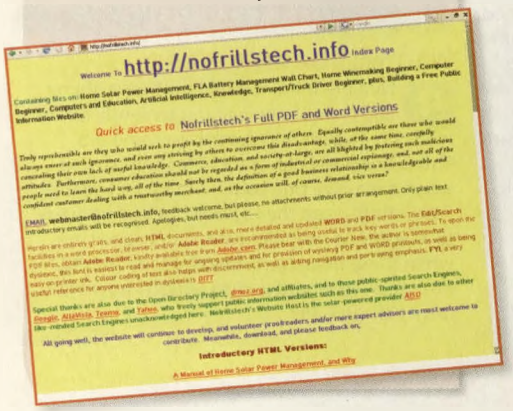
GETTING MONITORS TO WORK

Q I have been using a Samsung SyncMaster 910N monitor with a Radeon 9600 video card on W2K Pro for a while without any trouble.

PARTITIONING

If you need to partition drives for dual-booting, I suggest that Partition Logic is much easier to use than GParted (especially for Windows). It's slow, but very sure; it does not dicker over Display; and it has a clear user interface.

Paul Clifford
http://nofrillstech.info



30in SyncMaster 305T: are you running into problems with it?

Rear projection TVs — can you get True HD working on them?

DVORAK KEYBOARD

WINDOWS HAS DVORAK

I read your quick guidelines on building a Dvorak Keyboard (cool idea) and then sat thinking about this for moment. But if I typed 'Dvorak keyboard' into my flash, new, homebuilt creation, my screen would display the following: 'H.soav vdtnsaoh' (that's right, isn't it?) I was left wondering how my keys know what position they're in? A quick Google search and I realised that you'd left out a key piece of information. You need to change your regional settings to tell your PC you're using a Dvorak keyboard! For information on changing regional settings in a host of OSs, and other Dvorak keyboard-related tips, head over to *www.dvorak-keyboards.com*.

Editor writes: D'uh, we left out the most important bit of info — you need to tell Windows to switch to a Dvorak layout.

BY BEN LUCAS
Is in the RAAF, he enjoys photography — the computer is just a side interest.
http://defence.gov.au

I recently purchased a Syncmaster 305T monitor, but cannot get it to work. I have followed the setup instructions that came with the new monitor and, when I switch on, it shows all the correct boot-up images until it reaches 'Windows 2000 Professional. Starting Up'. After that, the screen goes blank. The boot-up continues to completion, however, as I can tell from the sounds on the separate speaker system, but the screen remains blank and useless.

Alastair Munro

A The 30in SyncMaster 305T uses the new Dual-Link DVI digital video standard — a Dual-Link DVI connection includes a secondary data link (additional pins on the DVI connector) to accommodate higher resolutions such as the 305T's WQXGA, 2,560 x 1,600 resolution. To achieve WQXGA you require a Dual-Link DVI cable (included with the 305T), a Dual-Link DVI-capable video card (or cards in a multi-video card setup) and a supporting monitor. Whilst Samsung has informed its reseller base of the requirements to achieve WQXGA on the 305T (including listing some of the supporting cards at **www.samsung.com.au**), it does appear that in this case this was not properly explained to you when you purchased the screen. Please contact me directly to discuss further.

BY SIMON KING
Simon is the IT Display Solutions manager at Samsung Electronics.
www.samsung.com.au

MULTIMEDIA

GETTING HDTV ON REAR PROJECTION

Q I bought this great rear projection TV two years back and have just purchased a media centre PC. Naturally, I would like to hook them up but I have run into a barrier regarding connections. My TV does not have a HDMI or a RGB plug, and my video card does not have component sockets, so at the moment all I can view the media centre with on my glorious HD monster TV is through a very poor S-Video connection. Do you know of any PC video cards that could help? HDMI is a no-go for me as the TV has no HDMI sockets. I was told that a PC-to-TV converter (like this one at **http://micronica.com.au/catalog/mc4000/**) is my only real option for a HD signal. Would you agree?

Erik Fazekas

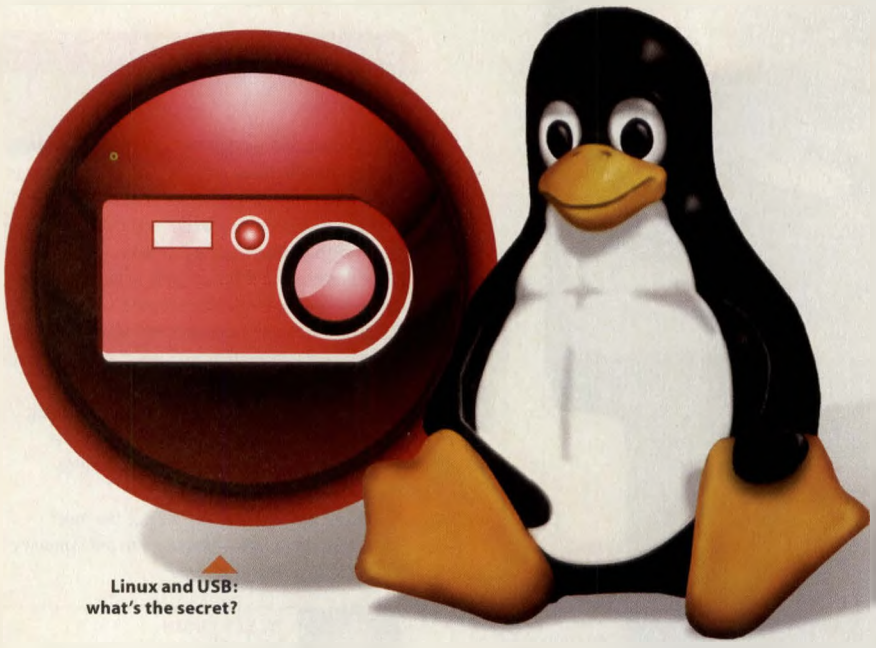
A Rear projection TVs bought two years ago may *not* have the HD capability, which is a minimum of 1,280 x 720. It's unlikely your TV is high definition, since you said there are no RGB (or Y Pb Pr digital) inputs, which will then mean that it's an SDTV (Standard definition, hence 720 x 576 max. standard PAL TV). Even S-Video only delivers 720 x 576 max. quality. Therefore, achieving True HD quality will be impossible. You may have been misled into thinking that the Micronica MC-4000 PC-to-TV converter will give you the solution, since it converts VGA to HD signal, but HD will only work with the Y Pb Pr or VGA output — hence, you're still stuck. Bottom line is: unfortunately, you will not be able to enjoy the full HD experience, but you can enjoy the fun of a nice big screen via the MC-4000 (but at a lower resolution).

BY YING ZHENG
Ying is an IT student at Monash Uni studying web design in his spare time.
www.visionaryfocus.com/

WINDOWS

CLOSE OPEN PROCESSES

Q I have a few applications that occasionally stop responding and require me to constantly restart the PC. How can I close all my



Linux and USB: what's the secret?

running applications without resorting to restarting Windows?

Barry Hines

A Applications that misbehave can suddenly stop responding and cause Windows XP and Server 2003 some problems. For instance, an application that's not responding can grab CPU cycles and cause the operating system to become unresponsive. For most XP users, the only solution is to restart the PC, which in turn forces Explorer to restart — and so return system resources to other applications running normally.

An example of this may be a poorly written ActiveX control that causes Internet Explorer to stop. It's much more of a problem for a server to be restarted, particularly if the server is running critical services, such as a domain master role or DNS/ DHCP service. What's actually required in this situation is a way to restart Explorer without restarting the PC or server.

Fortunately, Windows provides a 'backdoor', which enables for this occurrence. Developers frequently use Explorer shell extensions to add functionality to Windows. An example of this is a program that adds additional choices into the right-click menu. XP and Server 2003 also contain a hidden routine that enables developers to restart Explorer while testing programs, without having to restart the PC at all.

Close as many open programs as possible including Widgets and Sidebars. Go to the Start Menu and choose 'Shut Down' — while the 'Shut Down' dialog is open, press and hold the Shift, Ctrl and Alt keys. Keep holding these keys down and use the mouse to press the 'Cancel' button in the 'Shut Down' dialog — Explorer will quit cleanly. Invoke the Windows Task Manager from within the Task Manager, choose 'File' and 'Run' and then type 'explorer' in the run field. Press 'OK' and Explorer will automatically restart.

WINDOWS

QUICK DELETE

From time to time I am frustrated by the amount of time that Windows takes to delete a file. It turns out there is a simple explanation. To delete a file, the OS needs to transfer it to the Recycle Bin, but it needs to build a file map of the Bin first. If the Bin is full (and very large), this can take forever. Try this: delete a file and note how long it takes. Then right-click on Recycle Bin and hit 'Empty Recycle Bin'.

Now try a file delete. It should be instant. The other perspective on this is that the default size of the Recycle Bin is quite large (20%). Make the Recycle Bin smaller, say 5%, and the problem will go away permanently. It turns out this also greatly speeds up a shut-down (I guess that during a power-off a number of files need to be deleted).

Graeme Zimmer

LINUX

CONTROLLING USB DEVICES

Q I can plug my camera into my Linux box and it mounts under KDE, but how do I unmount it? How do I make it flush its cache before it loses contact?

Clark Whatton

A When you plug in a USB storage device, a KDE daemon opens a dialog box to give you options. The default is 'Open in a New Window'. Pressing Enter opens this, but removing it safely is an entirely different matter. If you haven't got camera icons in the panel, right-click and select 'Panel Menu' > 'Add Applet to Panel...' and in the dialog box that appears click on 'Storage Media' and then click on 'Add to Panel'. A camera icon will appear in the panel for each USB block device and floppy. Remove a device properly by left-clicking on the icon and selecting 'Safely Remove'.

PATCH WITHOUT REBOOTING

MICROSOFT'S HOTPATCH METHOD MINIMISES DOWNTIME

System administrators must keep servers and systems up and running with few or no interruptions. Yet, with security updates and critical fixes released almost daily, it's important to find a way to install and update critical servers without the need for downtime caused by rebooting. A partial answer to this problem is to install updates as hot patches. A hot patch installation divides the update into two parts: a hot patch binary containing just the fixed code, which is loaded into memory for processes already running; and a cold patch containing the fixed code appended to the old binary. The cold patch also contains an instruction to redirect to the fixed code to just above the old code. The hot patch patches the server while running, and the cold patch ensures that the patch is applied following the next reboot. Importantly, the hot patch also ensures the security of the server until that point. Not all patches are hot-patchable, but Microsoft estimates that using hot patching where it's at all possible can effectively reduce server reboots by half. Hot patches are available from the Microsoft Download Centre via the Software Installation Wizard. If you choose to go for a non-Microsoft patch, it may also be possible for these to be hot patch-enabled from the command line.

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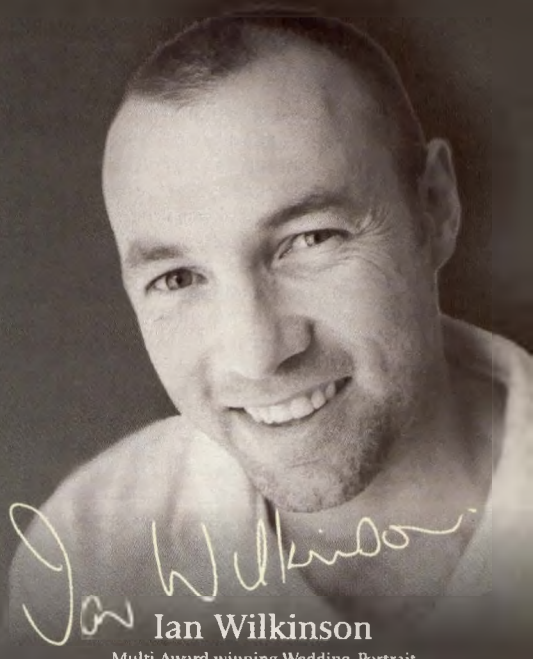

Ian Wilkinson
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PROGRAMMING

YET MORE 'HOW TO LEARN PROGRAMMING' ADVICE

Q I am a recent high school graduate who regrets not having done computer programming at school. What is the best way of going about learning how to program?

George Iannou

A Not studying IT in high school definitely isn't a disadvantage. Programming is good fun and it's relatively easy to get into. For game development, I'd recommend taking a look at a product called DarkBASIC Professional (**http://darkbasicpro.thegamecreators.com**). It's the perfect introduction to programming, because it's in a Windows-based environment. This makes it beginner-friendly and it has some relations to more advanced programming languages, such as C++, which makes migrating between the two much easier. There are also loads of tutorials, so, my advice would be to download the trial, read the tutorials, and have a play around with the program.

BY ANTHONY MARKHAM
Anthony is a game developer at Veron Games.
www.verongames.com

A Microsoft has a web site called 'Beginner Developer Learning Center', dedicated to providing people with resources to give them a headstart on programming. Instead of reading text-book tutorials, you will have the chance to watch videos on how things are done in Visual Studio instead. There are two paths (web and Windows) that you can take, so just pick the one that suits you best. (Pick both if you want to try things out.) If you try to search for computer-related jobs on the internet, you will be surprised to see how many .NET related jobs you will find. :)

Beginner Developer Learning Center: **http://msdn.microsoft.com/vstudio/express/beginner/**.

Visual Studio Express (free version of Visual Studio): **http://msdn.microsoft.com/vstudio/express/**.

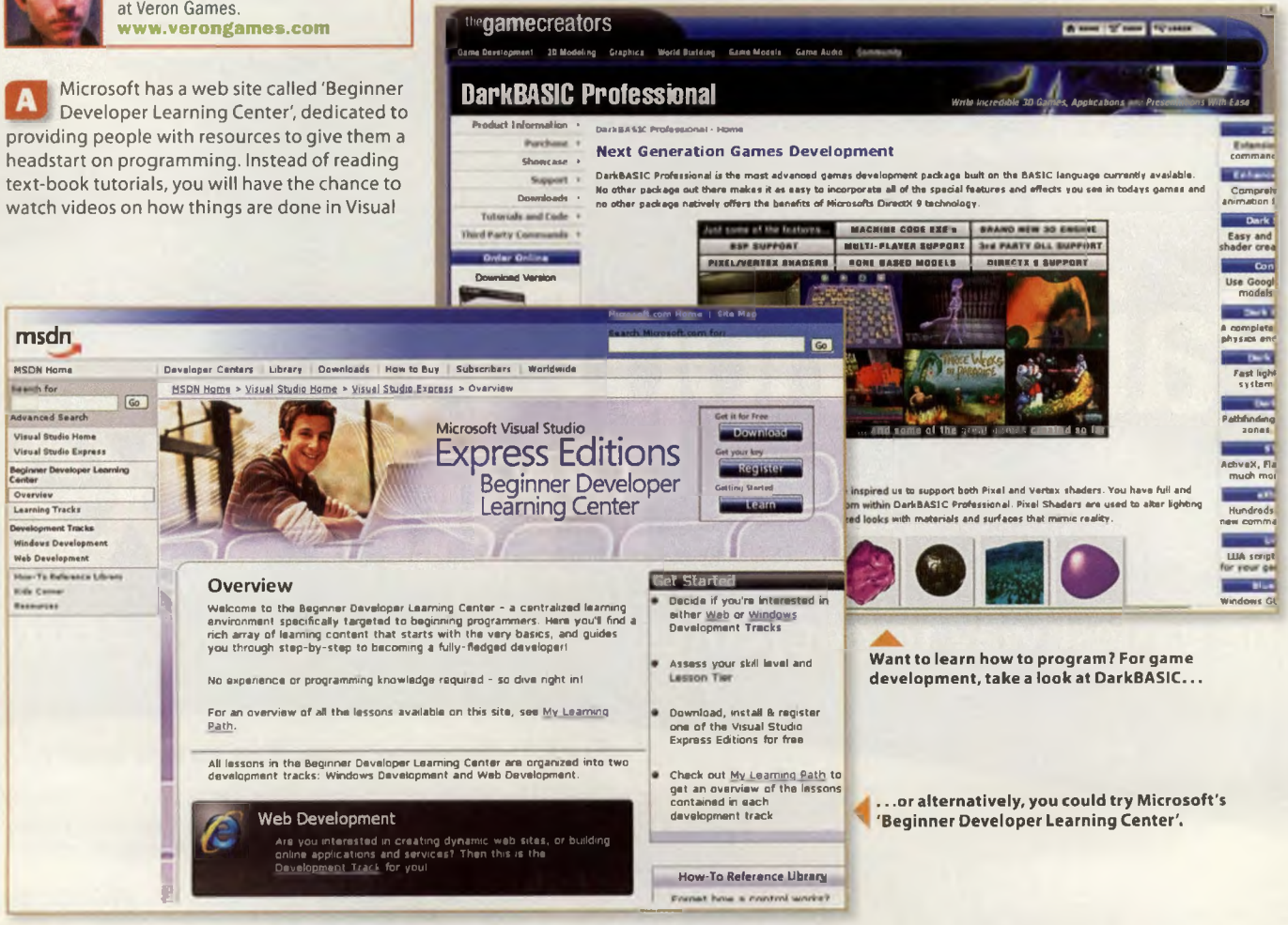
BY DAVID XIE
David is a third-year computer science student at the University of Otago.
davidtse916.wordpress.com/

A First, locate a programming language, then get a good reference book on it. Next, set yourself a project. There is no point in merely fiddling. Start off simple and then build on it. Don't try and write the best, most fabulous program in the world. As to which language, the best one to learn on is Pascal, because it is a structured language. It requires you to follow a definite structure. There is the GURP (Great Underlying Rule of Pascal): something must be defined before it can be used. So, if a variable, constant, function or procedure has an error, then it simply means you have to look in the code before the point where it has been called. Just to confuse things you can have a forward declaration, but at least that has to be declared before it is called. :)

You can try and learn languages like C, but it gives you enough rope to hang yourself with! Then there is the old standby of Basic — these days Visual Basic.

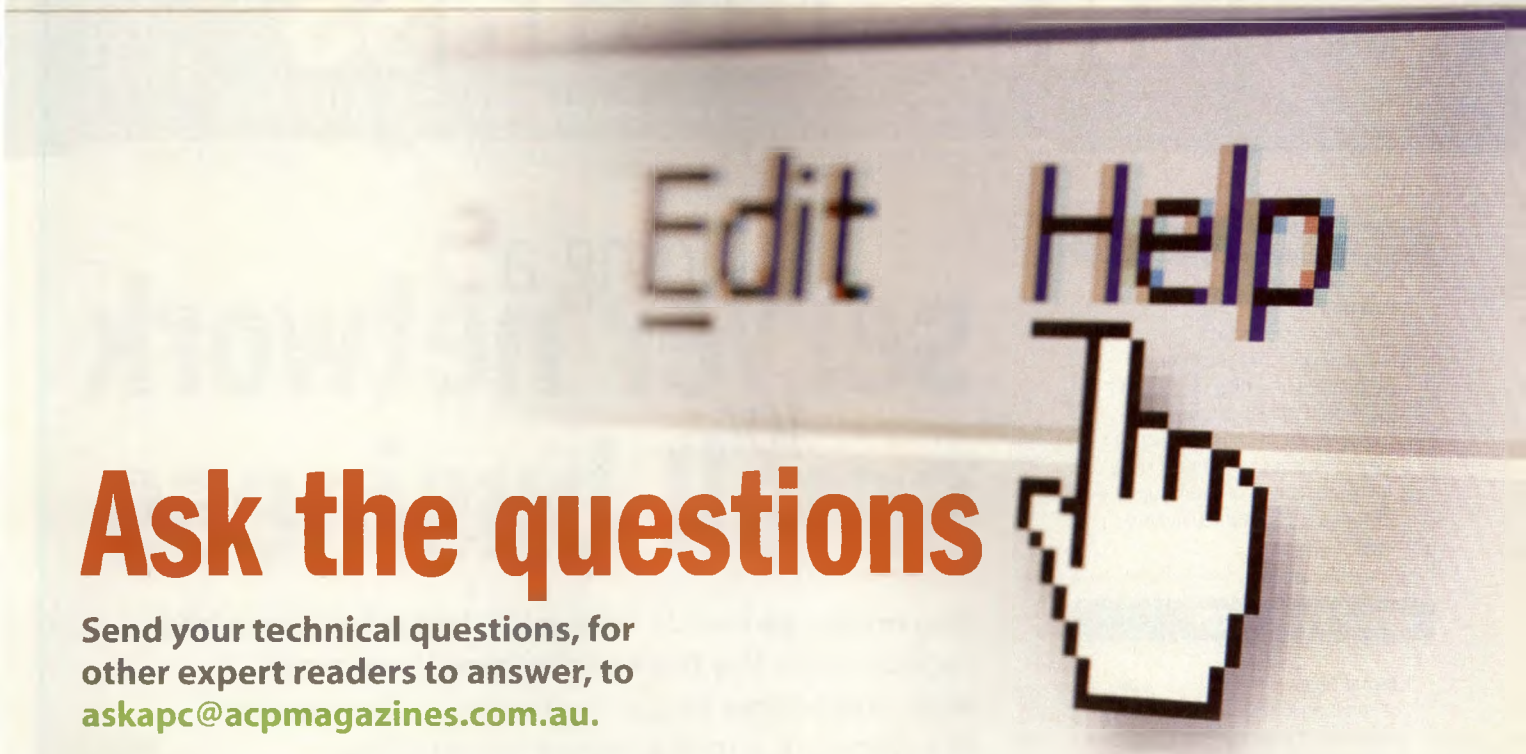
Whatever you choose, take it in small steps as you get to learn the ropes. As to a project, why not try to write a Lotto number selector. Not only will you learn how to design a screen, accept and validate user input, manipulate the inputs and then display the results, you might even win something. Such a program also has well-defined rules and conditions.

BY IAN A. WHITE
Ian runs WAI Engineering, specialising in AutoCAD services and training.
www.wai.com.au



Want to learn how to program? For game development, take a look at DarkBASIC...

...or alternatively, you could try Microsoft's 'Beginner Developer Learning Center'.



Ask the questions

Send your technical questions, for other expert readers to answer, to askapc@acpmagazines.com.au.

Q I am in the process of purchasing a digital handycam and require some advice as to what are the advantages and disadvantages of the two available systems, namely, direct to DVD or on to the internal hard drive — do you have any info?

John Proud

Q I have a question that I would like you to answer: is it possible to have virtual memory on the hard disk without swapping data constantly into RAM and using it like a swap file, instead accessing it directly?

Delan

Q What's best/faster to compile a RAID array? I recently purchased a 74MB Raptor with the intention of one day buying another and building a RAID system (as the purse strings permit). Knowing the Raptors are the fastest drives at around 10,000 rpm, they have a 1.5GB/s data transfer rate. Whereas SATA 2 have 3GB/s data transfer rate at 7,200rpm. My question is, should I look at 'rpm' or 'dtr' for the faster RAID?

Lindsay Clarke

Q I use a Dell 8400 PC running MS Vista. I have been archiving my CD music collection to my HDD; recently, the quality of the recording has diminished drastically. I get jitters and fluctuating volume levels. I normally use MS Media Player in the WMA format. I have since used other software and media formats including MP3 to no avail. I recently used a CD/DVD lens cleaner from 'Invert your Mind', but this seems to have worsened the problem. I suspect that it must therefore be a hardware problem. Please help!

David Rich

Q I decided one day to set a key to manually bring up my passworded screensaver, thinking this would take two minutes... A shortcut to the desktop opens the correct screensaver but isn't pass-protected — I'm sure I am missing some simple way to do this?

Spx

Q My XP computer has lately been running very slowly and some programs have been doing very unusual things. I ran a virus program and a full virus check OK. I have done all the usual things to tidy and speed it up. I occasionally run Acronis True Image and take a full image of the hard drive for backup protection. Can you advise please: a) can I do a reinstall just of Windows, and do you think this is likely to help?; b) can you advise anything else that I could try rather than doing a complete rebuild, which is likely to take several days?

David Cullen

Q My computer seems to be losing space on C: It is partitioned so that C: just contains Windows and I put my data on G: and H:. However, I have noticed that my C:, which is 12GB, has only 250MB free space when I turn it on. After I do anything, ie. surf the net, it drops 4MB for each application, and as I type it is now at 185MB. I am running AVG Antivirus to scan for viruses. What should I look at and try to get my free space increased and stop it dropping? How do I delete past restore points? Should I run a defrag? How do I check temp folders?

Greg

Answer the questions

If you feel you can answer one of the questions above, please send the answer to askapc@acpmagazines.com.au.

APC will give any readers whose answer is published a small promotion box in which they can promote their business with a mission statement or slogan, and a URL or phone number. Try to make the answer no longer than 200 words, but less is better. If none of our readers can offer an answer to a particular question, we will turn to our list of industry experts to provide a solution for your queries.

WHAT'S COVERED

Overview
In this new Masterclass, Jarrod Spiga walks you through the process of setting up a small business IT infrastructure. No IT training is assumed. At the end of the Masterclass, you should know the fundamentals of setting up a server-based network to run any small business.

ABOUT YOUR TUTOR

Jarrod Spiga
Jarrod is an infrastructure architect and data centre engineer for Visionbytes, a company that provides digital video mining technologies and services to some of the world's largest media companies and many government departments worldwide. Jarrod also works as a technical consultant, assisting businesses during infrastructure installation and upgrade projects.

COURSE SCHEDULE

Sept '07 Analysis
Oct '07 Preparation
Nov '07 Server hardware
Dec '07 The Windows path, part 1
Jan '08 The Windows path, part 2
Feb '08 The Windows path, part 3
Mar '08 The Linux path, part 1
Apr '08 The Linux path, part 2
May '08 The Linux path, part 3
Jun '08 Mac in the mix
Jul '08 System management tools
Aug '08 Swing migrations

Building a server network for small business

You might be handy with a PC, but what if you had to look after the back end of your business? How would you set up and manage the servers, the network and the server applications?

Part 2
Preparing for deployment

Once the initial planning process for your small business network is complete, you need to make preparations for all of the changes that you're about to make, says *Jarrod Spiga*.

At this point, you should have done all of the analysis for your new network infrastructure and answered all of the issues raised in last month's guide. You have a fairly good idea of what things are going to look like when you've finished your project and have a rough idea of how you're going to build it. And if you haven't already ordered your server and network hardware, you're about to.

In many cases, waiting for the hardware to arrive can take longer than what your deployment will take. However, this doesn't mean that you can sit around twiddling your thumbs — there's still a lot of planning and thought that needs to be done in order to make your network easier to manage once you have your server deployed.

GET WRITING

One of the things that I personally hate doing is documentation — but just because you hate doing a task doesn't mean that it doesn't need to be done. You don't have to be worried about documenting absolutely everything. Like with any piece of writing, there is a target audience and it's safe to assume that the only people who will read your documentation are those that are going to have at least a rudimentary understanding of how to fix problems. However, your documentation does need to clearly show specific configuration and policy-related information for your infrastructure.

The important thing to remember with your documentation is to make sure that someone else can quickly find the information that they need to when things go wrong. Hypothetically ask yourself, "What would happen if I got hit by a bus and a hard disk on the main server failed a couple of hours later?" If your replacement can't pick up your documentation and find the relevant information within 10 minutes, you might as well save the effort and paper.

Compulsory contents for your documentation include details on how

your network is connected, authentication mechanisms in place, what data is stored on what servers and in which location, your backup procedures, details regarding your internet connectivity, IP and telephony resources and usage and anything else that you may feel is relevant for your organisation.

In general, you should attempt to include all of the information about your infrastructure that does not change from day to day but which cannot be easily determined in the worst case scenario. For instance, detailing a list of user accounts that you've set up is useless — not only would you have to edit your documentation every time that you added another account, you'd have more pressing issues to look into if you couldn't obtain this information from other sources. For similar reasons, there's no need to document passwords — nor is it wise to do so from a security perspective.

PLAN FOR THE WORST, HOPE FOR THE BEST

Taking the above point even further, the most important document that you need to have is a disaster-recovery plan. While it's not possible to consider every possible thing that could have an impact on your infrastructure and to develop a plan to mitigate that effect, you should plan for the rare disaster that would have the greatest impact as well as for the common events that have minor impact.

Many catastrophic scenarios generally have the same impact on your equipment — total destruction of all hardware and data at your office. Whether this destruction was caused by fire, flood or any other disaster, your recovery plan is much the same. As such, there's no need to document a plan for each major disaster that you can think of — a 'one size fits all' list of instructions should suffice.

Where your disaster recovery plan does need more detail is for the minor problems that can affect your business. At minimum, you should consider scenarios involving hard disk, power supply, internet link, phone system, power, network, air conditioning and physical security failures. These issues are more likely to occur than your catastrophic disaster, and sticking to a pre-defined plan almost always sees shorter recovery times.

Don't forget to include a list of contacts in your disaster-recovery plan — include the contact and account details for your hardware and software suppliers, contractors and service providers in your plan, so that you have all of the information at your disposal when you need it the most.

Lastly, make sure that you keep a copy of your documentation and disaster recovery plans off-site.

CONVENTIONS = CONVENIENCE

In order to simplify administration, the use of various naming and addressing conventions is advisable. I have seen companies name systems based on various themes — from beer names to objects in our solar system. Each of these conventions has one major flaw — when John Doe exclaims, "There's something wrong with this PC", you have to determine whether he's referring to Duff, Tiger or Heineken.

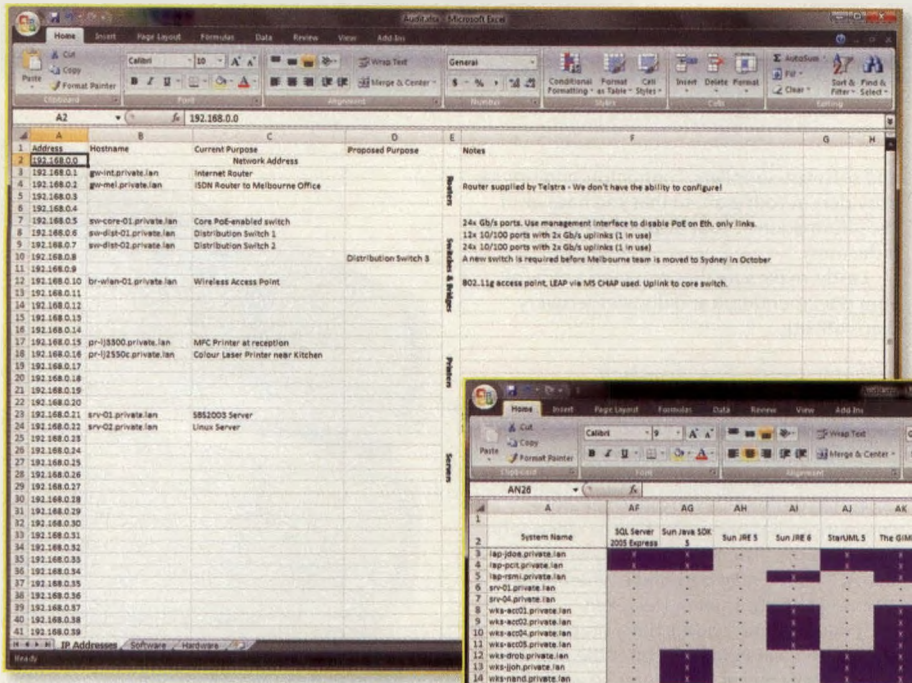
It might sound boring, but a simple convention of naming a PC after the primary user not only makes things easy to administer, it makes it easier for your users to provide more accurate reports. Citing the above example, John might now say "There's something wrong with Jane's PC," in the case where you have a shared system.

When planning your internal DNS namespace, avoid the temptation to use a domain name that is able to be resolved externally. Doing so will avoid the need for you to set up separate internal and external DNS servers and will also make DNS troubleshooting simpler on your network.

Additionally, it's a good idea to avoid using a domain name that is closely tied to your business name if you're setting up a Windows-based network. The main reason why is because small businesses can undergo rapid change, and it is very difficult and time-consuming to change the domain and NetBIOS names for your network. For instance, mergers, de-mergers and other name changes are more likely to occur in small businesses than large enterprise. While it is possible to change these names, the Active Directory domain rename process is extremely complicated and should not be done if it can be avoided — especially for cosmetic name changes. By picking a generic, non-public domain name, you can avoid these potential issues — 'private.lan' is a good generic example of this.

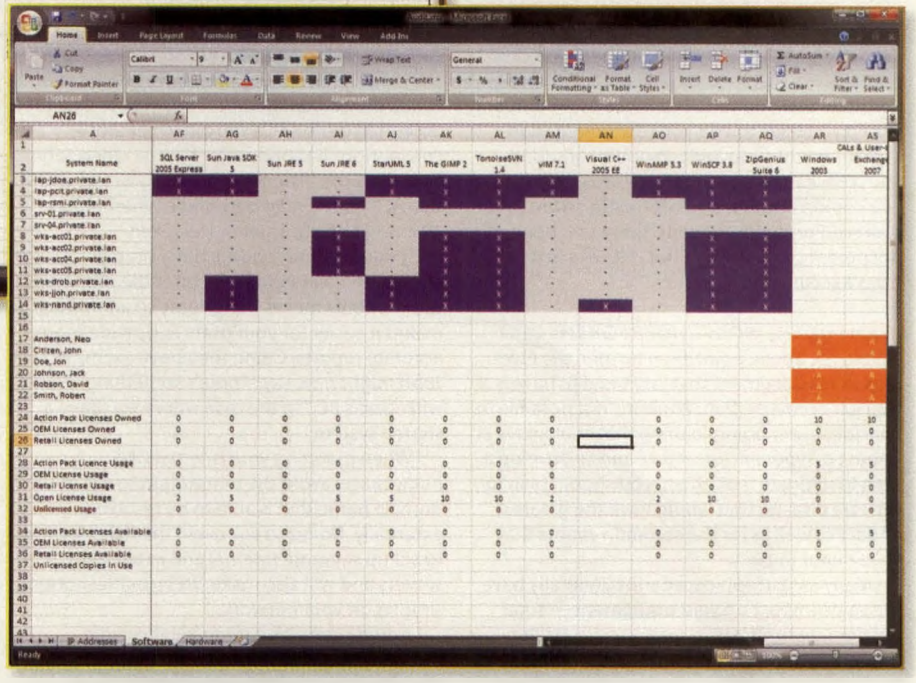
Lastly, if you are planning on connecting Mac systems to your network, avoid using the .local

MANY CATASTROPHIC SCENARIOS HAVE THE SAME IMPACT – TOTAL DESTRUCTION OF ALL HARDWARE AND DATA



Upgrade projects are an opportune time to take stock of the hardware and software assets that you have in your organisation.

Your documentation should clearly show specific configuration and policy-related information for your infrastructure.



suffix. Instead of performing regular DNS lookups for the .local namespace, versions of Mac OS X earlier than 10.4 (as well as some other versions of Mac OS) will attempt to perform a multicast DNS lookup courtesy of Bonjour. The result here is that your Mac won't be able to resolve the names of the other hosts on your network without additional reconfiguration of your Mac. As such, use something like .lan or .internal instead.

ADDRESS THIS SPACE

Like naming conventions, addressing conventions can also make the day-to-day administration of your network simpler. Take the time to come up with an IP addressing plan, separating blocks of your IP address range to different functions. For instance, you might use a 192.168.0.0/24 address range within your organisation. Split the range in half and use the last 128 addresses for your DHCP scope for use by client systems.

The first 128 addresses can be split a number of ways. The first 16 addresses could be reserved for network devices, including any routers, managed switches and wireless access points. The next 16 could be reserved for network printers, while the next 32 could be reserved for your servers. Any remaining addresses could be reserved for testing.

How you utilise your addresses is entirely up to you, but if you define pools of addresses for different purposes, identifying equipment based on its IP address becomes simpler.

PATCH PANELS PREFERRED

While you're waiting for your server and network equipment to arrive, ensure that your cabling is up to scratch. It's an opportune time to arrange for a licensed data cabler to come in to your office and move those Ethernet cables that are strewn under everyone's desk into walls and conduits, all terminating in a patch panel near where your network equipment is going to be installed.

There are numerous benefits to doing this, aside from the obvious aesthetic reasons. Even if cables are taped down to the floor, OH&S issues are still present. Properly installed cabling is less likely to be accidentally damaged by people kicking cables or rolling over them with their chairs.

Most importantly, if all of your network connections are brought back to a central location, not only does it become easier to secure physical access to your network (see below), it becomes easier to aggregate other services. If you have a PABX, you can utilise the same network cabling to carry both phone and data. If you plan on using VoIP, you can more easily manage the equipment that requires connection to a VoIP-enabled switch from the equipment that can be plugged into a distribution switch.Of course, keeping your patch panels neat and tidy is another matter...

SECURITY FROM THE GROUND UP

This is also an opportune time to think about security. Always remember that there is no guaranteed fool-proof approach to security (of course, as soon as we make something fool-proof, a bigger fool comes along). There's also little point in implementing security restrictions that hinder you while you're trying to do your work.

In other words, you only need to secure what needs to be protected, and you only need to apply a certain level of security to each resource depending on how sensitive, important or costly that resource is.

Citing the example of an accounting firm that was frequently mentioned in the last article, it would be prudent to implement a basic password policy on a central LDAP-based server in order to provide single sign-on for users — after all, users find it easier to remember one complex password than 20 simple ones. Access to printers and many file shares don't need to be secured in this case, but shares containing the financial records for clients probably should have tighter security settings.

Of course, there are physical security constraints that you'd also want to consider. Many offices utilise keys and/or proximity cards to prevent physical access to certain locations — and your server room should be one of these off-limits places.

While most people don't think that any physical connection is present with wireless networks, the underlying network model still considers the air a physical medium. Regardless, it goes without saying that implementing some form of wireless security is also required. Regardless of the type of encryption you use, you generally have two choices of authentication mechanisms to choose from — pre-shared keys (which are less secure as they are prone to brute force attack, but easy to set up) and the use of an Extensible Authentication Protocol (EAP requires considerably more effort to set up, is more secure and requires less effort for end users to use). Both options should be investigated and you should evaluate which method of authentication is better for your environment (this series will show how to configure all of the steps required in deploying EAP under both Linux and Windows environments in the coming months).

ASSET ASSESSMENT

You should also create an asset register before your new equipment arrives. Upgrade projects such as the one that you're about to undertake are an opportune time to take stock of the hardware and software assets that you have in your organisation.

Again, this doesn't have to be done in anything as complex as a database — a simple spreadsheet that details hardware components and serial numbers with system names, licenses with users and/or devices and applications installed on each system is all that's required for any small business.

A basic asset register is important to have to ensure that your business is compliant with its software licensing — and also helps you know what hardware is installed in each system without having to open up each PC. No more walking round the office looking for that TV tuner card!

CHANGES TO MICROSOFT ACTION PACK SUBSCRIPTION

In last month's article, we mentioned that, by becoming a registered partner with Microsoft, you then became eligible to subscribe to the Microsoft Action Pack Subscription (MAPS). Since the last issue went to print, Microsoft has made a change to the eligibility requirements for MAPS.

As of 30 November 2007, all existing and new subscribers will have to enrol in an online course through the Partner Learning Centre and pass the associated exam with a mark of 70 per cent or higher. This requirement needs to be met every two years in order to ensure that you continue to be eligible to receive the MAPS.

IT'S ALWAYS AN EXCITING TIME WHEN NEW HARDWARE ARRIVES, I'M LUCKY ENOUGH TO BUILD A SERVER A WEEK

WHEN YOUR HARDWARE ARRIVES

It's always an exciting time when your new hardware arrives. I'm personally lucky enough to build around one new server every week, and I don't think that I'll ever get tired of taking individual components out of their boxes and installing them in the server chassis.

But you have to contain your excitement to an extent and make sure that you properly record the serial numbers for your components in your asset register, and that you read the instructions for installing the hardware properly. This is especially true if you purchased a brand-name server. The retention mechanisms for heatsinks in particular are often different to what you see on desktop systems, and it's not too difficult to break things if you don't know what you're doing. Even the seemingly trivial task of installing memory modules should only be done after consulting the manual in order to determine which slots are best utilised. And don't get me started on removing some of the air baffles that direct air over the memory banks on newer servers!

When you have assembled your server, take the time to run a few burn-in tests before starting to set things up. Utilities including Memtest86+ (for memory testing), IOmeter (for disk testing) and CPU Burn-In (for CPU and cooling-system testing) can all be used to stress-test various server subsystems, potentially revealing some problems that may have gone unnoticed for perhaps weeks after you've completed deployment. You should run each test for as long as you deem necessary, to be confident that the hardware subsystem being tested is working properly.

Some of these burn-in utilities will require an installation of Linux or Windows to run — which is also an opportune reason to do a pilot installation of the operating system that you plan on deploying using either the quick-start CD provided by your hardware vendor (in the case of HP and some other server builders), or your OS installation media in conjunction with supplied driver disks.

If you were planning on using Windows Small Business Server, the installation can be broken down into two distinct phases — the base Windows Server 2003 installation is done in phase one, while the Small Business Server components are installed afterward. During your test installation, there's no need to install the SBS components — you're only interested in verifying the installation of drivers and the execution of your burn-in tests. To back out of the installation of SBS components, simply eject your media while your system is rebooting after the Windows installation — or click on the Cancel button when you encounter the "Continuing Microsoft Windows Small Business Server" screen.

Next month's Masterclass will start our walkthrough of setting up Microsoft Windows Small Business Server for a typical small business. If you have any questions relating to this article (be they general or workplace-specific) you can forward them to Jarrod via masterclass@acpmagazines.com.au . A selection of questions and answers will be published on the apcmag.com web site.

Who's using your network?

How to check what's happening on your network (and perhaps catch the neighbours stealing your Wi-Fi).

REQUIREMENTS

- **ETHEREAL**
  The open source network traffic analyser, available from **www.ethereal.com/download**.
- **A NETWORKED MACHINE**
  Running either Windows (including Vista) or Linux.

INSIDE INFO

- Ethereal documentation: **www.ethereal.com/docs**

Maybe the lights on your router sometimes flicker unexpectedly, or perhaps your web surfing is slow for no apparent reason. There's no-one else on your network and yet there's activity. Are you seeing benign housekeeping traffic passing between machines, or has someone breeched your defences, making you an unwilling member of a spam botnet or worse? Maybe it's the neighbours cheekily leeching your broadband connection via an insecure Wi-Fi router. With Ethereal, you can discover who's really using your network.

UP AND RUNNING

Start by installing both Ethereal and WinPcap, the packet capture library it relies on. Under Windows XP, simply run the setup program and accept the default settings. If you're running Vista, click to confirm the installation of WinPcap and Ethereal at the warning pop-ups.

Normally, the network cards in your machines will only accept data containing their own hardware MAC address and ignore everything else. WinPcap allows Ethereal to tell the card to accept any packet it sees.

Run Ethereal, click on the Capture pull-down menu and select the Interfaces option. A small pop-up appears, listing the interfaces from which we can capture data. Each interface has a set of three buttons associated with it. You may notice the numbers of packets seen on those interfaces increasing. Though Ethereal isn't capturing data, this shows WinPcap is working. Press the Details button by one of the interfaces and you'll see its configuration and capabilities.

Click on the 802.3 tab to see the MAC address of the interface. Returning to the Interfaces pop-up, press the Capture button associated with your physical network card. A new window opens displaying some statistics. As well as the number of captured packets, this window shows the make-up of the traffic in terms of protocol families.

DRILLING FOR DATA

Let's generate some traffic to capture. Open a web browser and go to **www.google.com.au**. The number of packets registering in the capture window increases. Press 'Stop' to end the session and Ethereal displays recorded packets in its main interface.

Ethereal shows the packets in chronological order, but you can also sort them by another column by clicking on a column heading. When you click on a packet in the top pane of the interface, the various elements it contains appear in the middle pane as collapsed trees, which you can expand to read the details.

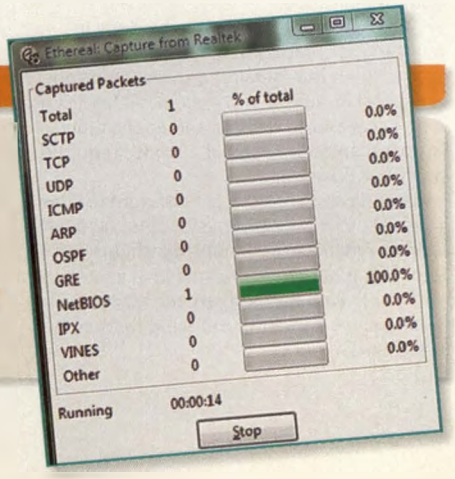
These elements consist of frame level data (general information such as the time of arrival, the protocols the packet contains and so on), Ethernet data, Internet Protocol information and Transmission Control Protocol information. At the bottom you'll find the actual data the packet contains.

Click on a packet whose protocol column says it contains HTTP. You'll notice that the last entry in the middle pane is marked 'Hypertext Transfer Protocol'. Expand this and you'll see the details of the request your browser made to

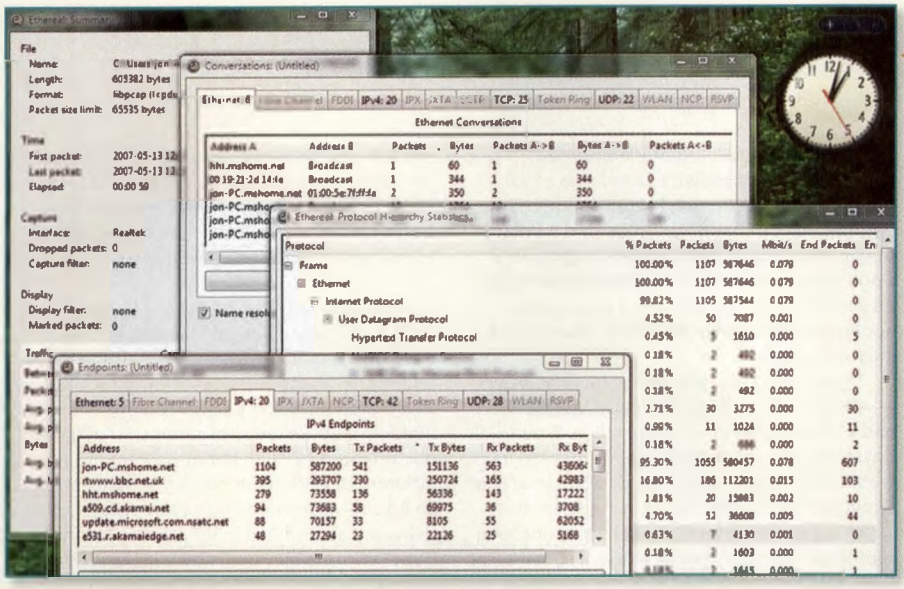
DO THIS... CAPTURE DATA FAST

After installation, it's easy to quickly start monitoring your network using Ethereal. Simply run the program, select the Capture pull-down menu, select 'Interfaces. . .' and a pop-up appears detailing the interfaces available for capturing data. Select the one with an IP address and press its Capture button.

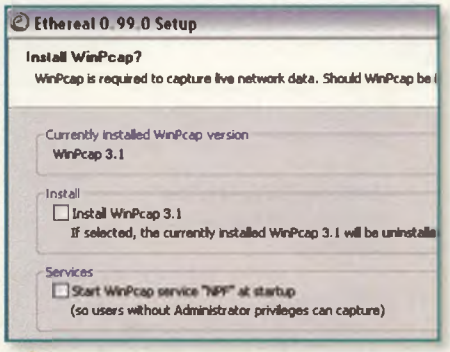
The resulting window shows the data you're capturing in the form of a total number of packets and a bar chart. When you're done, press the Stop button and the main Ethereal window will display the packets it captured. Click on one of the packets to display its content.



As it captures data, Ethereal shows a graph giving the basic make-up of the packets collected.



The program provides you with all the information you need to see exactly who's using your network and what they're doing.



Ethereal installs with the WinPcap library, which it uses to capture traffic not meant for your machine.

IF YOU CAPTURE A LOT OF TRAFFIC, FILTER THE PACKETS SO YOU ONLY SEE THOSE IN WHICH YOU'RE INTERESTED

Google to display its homepage or some of the data that came back from the server. It's all in plain text, and this brings us to a very important point. If you send a username and password over an unencrypted link (one that doesn't use https), your credentials are as readable as the content of this packet.

If you capture a lot of traffic, it's a good idea to filter the packets so you only see those in which you're interested. You can filter what Ethereal displays in several ways. At the top of the upper pane is a field marked 'Filter'. You can enter a protocol name here and display only the captured packets containing that protocol.

For more powerful filtering, click on the Analyze pull-down menu on the main interface and select 'Display Filters...' Select the entry marked 'IP Address <IP>' (where <IP> is your IP address) and press Apply. Ethereal now displays just the packets leaving your machine. You can remove the filter by pressing the Clear button.

You can also obtain some useful statistics about captured traffic. On the Statistics menu, the Summary option produces an overview of the amount of traffic captured. The Protocol Hierarchy Statistics option provides a further breakdown by protocol. Conversations summarises the connections made to remote servers during the capture period, and Endpoints shows you details of individual conversations.

You can easily follow the flow of packets that make up a connection. Click on the View menu, select Name Resolution and ensure that there's a tick by all three options. If you now press Ctrl+R, the data will redisplay with resolved domain names instead of IP addresses. Click on the Source or Destination column headers and the data will sort itself accordingly, making it easier to see what's going where.

You can display just the packets for one connection, too. Right-click on a packet and select 'Follow TCP Stream'. The resulting window gives you every byte transferred, but if you close this, you'll also see that the display now shows just the packets captured for that connection. Press Clear to return to normal.

INTO THE UNKNOWN

Ethereal is a great tool for uncovering hidden traffic. Begin a new capture and visit a site you know is both safe and carries adverts from third parties — **www.radiotimes.com**, for instance. End the capture and scroll through the packets, looking at the domain names. Along with the Radio Times, you'll see connections to places such as Forrestersurveys.com, Akamaiedge.net and others, from which the main site serves ads.

Similarly, when you open a spam email containing linked images, the mail client will fetch the image from the server where it's hosted, thereby telling the spammer that you're reading your mail and proving to him that he's bombarding a live account. Using Ethereal, you'll be able to see the IP address of the spammer's server and report it.

Not all traffic is potentially sinister, however. Leave Ethereal running on your home network for a while and you'll see plenty of traffic as machines chat to each other. They regularly poll each other using the ARP protocol to discover who has which IP address. Using DHCP, they request new IP addresses and renew old ones. If you connect to a share on another machine, you'll see SMB traffic just as you'll see NFS traffic if you mount a remote Linux file system. You'll also see Microsoft's own protocols (NetBIOS, Browser and so on), ensuring each machine knows what facilities the others provide.

Using Ethereal, you can also spot intruders who might not necessarily want to hack you, but who certainly shouldn't be there.

DOMESTIC DISTURBANCE

Some people don't upgrade to broadband. Instead, they leech bandwidth from their neighbour's connection by adding themselves to their Wi-Fi network. After all, how would the neighbour know? Simply leave Ethereal running for an evening then display the summary of conversations. Sort it by the 'address A'. Can you see an unknown IP address on your network? If so, match it with the MAC address found in the Ethernet data for one of the packets to make sure it's not one of your machines. You can also see the sites surfed to and the email servers contacted by the intruder. If you discover such traffic, beef up your wireless router encryption and have a word with the neighbours.

Display Flickr on Adobe AIR

Want to use AIR to bring Flickr onto your screen with just a few lines of code? *Simon Bisson* shows you how.

REQUIREMENTS

- **ADOBE FLEX BUILDER 3 BETA**
  Download from **http://labs.adobe.com** (registration required)
- **ADOBE AIR BETA RUNTIME**
  Download from **http://labs.adobe.com**
- **FLICKR API KEY**
  Sign up online: **www.flickr.com/services/api/misc.api_keys.html** (Yahoo! ID required)

INSIDE INFO

- Adobe Labs web site where you can download Beta versions of the AIR development tools **http://labs.adobe.com/technologies/air/**
- Adobe Labs AIR FAQ **http:/labs.adobe.com/wiki/index.php/AIR:Developer_FAQ**
- Aptana JavaScript IDE, AIR support **www.aptana.com/air/**

AIR, or Adobe Integrated Runtime (previously known as Apollo) is a tool for delivering internet-style applications to the desktop, wrapping up Flash, PDF and AJAX (via the open source WebKit browser engine) in a single application. All you need is AIR running on your PC, and you can download and run applications that work with both internet and local resources.

There's one huge advantage for developers — AIR runs on both Windows and Mac OS X, and a Linux version is in the pipeline. When developing in AIR you get one API for working with the file system, and one for displaying your application UI — and it's the same no matter which OS your users are using. Java might have promised 'write once run anywhere', but it's AIR that's delivering a consistent cross-platform development environment. An AIR application might use the OS's own look and feel, or it might use your own UI. As the core technologies in AIR are familiar web development and design tools, it's also easy to get started — and easy enough to move over from tools like Visual Basic or Java.

The latest beta is closely linked to the beta for the next release of Adobe's Flex web application development platform (codenamed 'Moxie'), and the beta of the latest version of Flex Builder will also build AIR applications. The Flex Builder 3 beta is currently available for free download from the Adobe Labs web site, so you can use it to start learning to work with both Flex and AIR. The beta will time out — but Adobe isn't shutting out casual developers. The Flex 3 platform will be open source, and there are several projects under way to develop and build free AIR and Flex development tools.

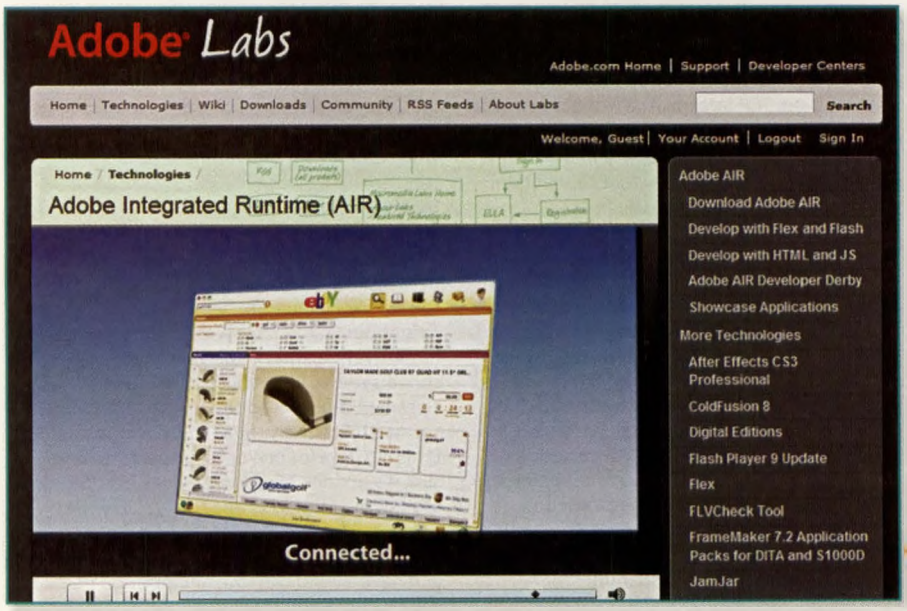
FLICKR AND FLEX

We'll be using the beta of Flex Builder 3 to develop a tool for browsing the top 20 most interesting images for a set of Flickr tags without a web browser. Flickr's a good platform for building web-linked applications; it has a well-documented API with libraries for many different development platforms. While there's an Adobe-sponsored open source project that's delivered a set of ActionScript Flickr libraries for both Flash and Flex (and now AIR), we'll be using Flickr's lightweight REST XML over HTTP interfaces. You'll find documentation and test tools for the Flickr API at **www.flickr.com/services/api/**.

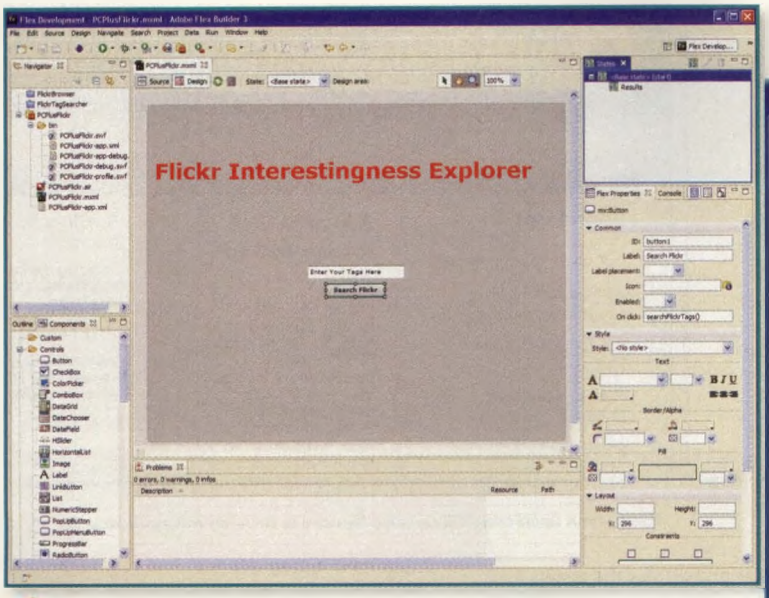
Like other platforms, Flickr requires you to sign up for an API key, helping it keep track of who's using the service. For non-commercial use it's free, so just sign up online and give an explanation for why you want a key. Your key will be issued automatically, and can always be found in your Flickr account details. Sign up at **www.flickr.com/services/api/keys/apply/**. You'll get two keys, a long key and a shorter secret key that's used when authenticating users on the service. As our application is only querying the public APIs, we'll just be using the first, longest key.

Launch Flex Builder and from the File menu choose New, picking an AIR project. This will create the files needed to build an AIR application, along with the initial framework of your application. The Flex Builder application is based on the Eclipse IDE, and you'll find a familiar code editor, along with a Flash-based design surface.

AIR owes a lot to its Flash ancestors, especially when you're using Flex to develop your application. It has a state-based approach to UI development, with each UI view treated as a separate state. A State explorer helps keep control of what you're doing! In the Design view add a second state to the Base state, giving it the name 'Results'. In the base state, create a simple

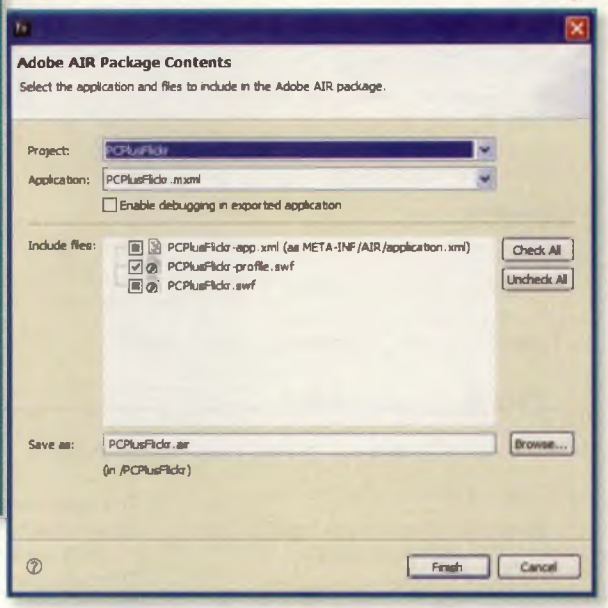


You can find out more about how to use AIR at Adobe Labs — *http://labs.adobe.com/technologies/air/*.



The Flex Builder 3 Beta is ideal for building AIR applications, with a Flash-based design surface where you can lay out application screens.

Once your code is complete, use the export tools to make an AIR package and run it on a PC or Mac.



search screen with a title (using a Label control), a text entry box and a button. You can drag these onto the design surface from the Components view. In the properties pane, give the text box an ID of 'tags' and set the button's on click action to call the searchFlickrTags() function.

Switch to the Results state and delete the components you added to the Base state. Now switch back to see that they're still on the Base state and change from Design view to Source view. You'll now see the code that's been generated by our initial layout. Flex uses two different techniques for developing AIR applications. The first of these is Adobe's MXML layout language. This is an XML description of the Flash components that will be used to create our AIR application. The second is ActionScript 3, an ECMAscript dialect. You'll find ActionScript is similar to JavaScript, with some Flash- and AIR-specific functions.

DEFINING A SERVICE

We can now add the code needed to make our call to the Flickr web service. The Flickr API is well-documented, and you'll find the arguments you'll need on the Flickr web site. We'll be using the flickr.photos.search method of the service, found on the web site.

In Flex Builder, scroll down to the closing mx:states statement. Add a couple of newlines to add some space, before adding the following code:

```
<mx:HTTPService id="flickrSearch" url="http://
api.flickr.com/services/ rest/"
method="GET" showBusyCursor="true">
<mx:request xmlns="">
<method>flickr.photos.search</ method>
<api_key>YOUR API KEY GOES HERE</api_key>
<tags>{flickrtags}</tags> <sort>interestingness-
desc</sort> <per_page>20</per_page>
</mx:request>
</mx:HTTPService>
```

This is the setup for an HTTP web service. The service ID will be used to call the service from the main body of our application, and the URL is the base URL of Flickr's REST web service. We'll also define the HTTP command used to connect to the service, setting method to GET. Finally, we'll give our users some notification that we're working with a remote service by displaying a 'busy' cursor until the results are returned.

Next we'll set up the actual request structure. The mx:request tags wrap a small section of XML that lists the query terms we'll be sending to Flickr. The first is the web service method we're using, along with our API key. As the tags are our search term, we'll set up a databinding to a flickrtags string that will be defined in the main body of the application. Finally, we choose the sort type — here displaying the top 20 most interesting images for our search terms — and the number of results that are returned by the server.

CALLING OUT TO FLICKR

Now that we have a service, we can write some code to use it. After the <mx:WindowedApplication> tag at the start of your application, add the following Script block:

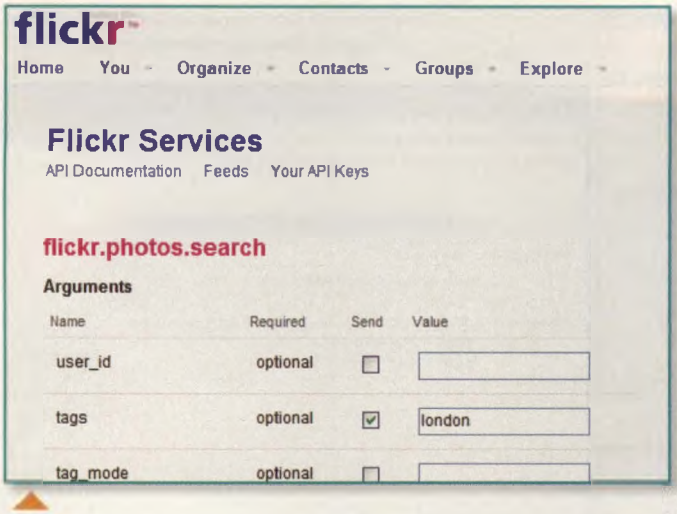
```
<mx:Script>
<![CDATA[
import mx.rpc.events.*;
import mx.collections.*;
import mx.controls.*;
[Bindable] public var flickrtags: String;
private function searchFlickrTags(): void {
flickrtags = tags.text;
flickrSearch.send();
currentState = 'Results';
}
private function faultHandler(event:
FaultEvent):void {
Alert.show("error opening file")
}
]]>
</mx:Script>
```

Adding an mx:Script tag will automatically create the <![CDATA[ ]]> block that wraps the code. We'll then import some standard Flex libraries, to simplify our code.

The first variable we define is the flickrtags string used by the service call. We'll give this a [Bindable] attribute in order to link the ActionScript code and the MXML. Next we'll create the searchFlickrTags() function used by our search button. This will set flickrtags to the text typed into the search text input box. After that, we'll trigger our service call and switch state to our applications results view.

SHOWING THE PICTURES

After the two RemoveChild statements, add the following block of MXML:



Flickr lets you try out queries from a web page and view the results.

The Aptana JavaScript IDE can also be used to develop AIR applications.

```
<mx:AddChild position="lastChild">
<mx:Panel title="Photo results" width="100%"
height="550" cornerRadius="8">
<mx:Tile width="100%" height="472"
cornerRadius="2" borderStyle="solid"
borderThickness="3" backgroundColor="#1412
12">
<mx:Repeater id="photos" dataProvider="{flick
rSearch.lastResult.rsp. photos.photo}">
<mx:VBox horizontalAlign="center" >
<mx:Image source="http://farm{photos.
currentItem.farm}.static.flickr.com/{photos.
currentItem.server}/{photos.currentItem.id}_
{photos.currentItem.secret}.jpg" />
<mx:Label text="{photos.currentItem.title}"
color="#FFFFFF"
/>
</mx:VBox>
</mx:Repeater>
</mx:Tile>
<mx:Button label="Search Again" click="curren
tState=''"/>
</mx:Panel>
</mx:AddChild>
```

This code will take and display the results returned by our call to the Flickr search service.

You'll see an mx:Panel hosting an mx:Tile. These are used to provide a basic layout for the application. The key to displaying the information is the mx:Repeater control. Unlike most of the Flex controls we've used in our application, this one isn't available from the component toolbox. A repeater is one of those simple tools that makes complex tasks easy — in this case, iterating through a large amount of XML data. You can see the structure of the information returned by the Flickr API using its API explorer (**www.flickr.com/services/api/explore/**). Choose the API function you want to text, select the arguments you want to use and wait for the results. The following snippet of XML is part of the results returned when searching for the tag 'London'.

```
<rsp stat="ok">
<photos page="1" pages="104656"
perpage="20" total="2093110">
<photo id="552707818"
owner="67894410@N00"
secret="67b5f0906a" server="1297"
farm="2" title="15062007026.jpg"
ispublic="1" isfriend="0" isfamily="0"/>
<photo id="552689302"
owner="57186037@N00"
secret="0ceca3a40f" server="1272"
farm="2" title="FW: Roadshow !"
ispublic="1" isfriend="0" isfamily="0"/>
```

We need to extract specific pieces of information for each photo returned, to construct a URL that will actually display the image. Luckily Flickr provides this structure for us: 'http://farm{farm-id}.static.flickr.com/{server-id}/{id}_{secret}.jpg'.

URL CONSTRUCTION TIME

All the information we need is in the XML document returned by Flickr, so we can use this as a data source for our repeater. The repeater's ID is used as part of the URL constructor in the mx:Image tag, as its content is updated at each pass around the repeater 'source="http://farm{photos.currentItem.farm}.static.flickr.com/{photos.currentItem. server}/{photos.currentItem.id}_{photos.currentItem.secret}.jpg'.

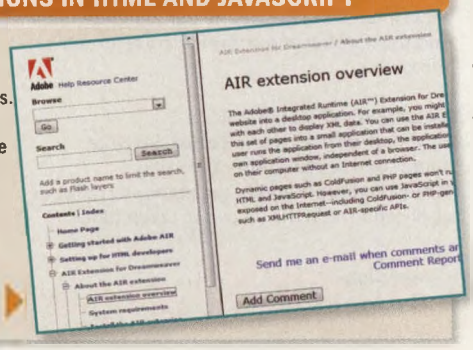
We can also take the image caption and add it to our image explorer application, using it to set an mx:Label to the image caption.

Finally we'll add a 'Search Again' button. This simply resets the AIR application view state to the Base state, letting our users start again. Once all our code, both ActionScript and MXML, is in place we can test our application. The test button creates an SWF file and runs it in a standalone development Flash player. You can use this to debug your code, with the built-in debugger in Flex Builder.

Once our code is running we can publish it as an AIR file, ready for distribution around the internet. From the Project menu, choose Export AIR Package. Choose the files to be included in the package, along with a target directory, and click Finish. You'll find an AIR file in your project directory, ready to be installed on a PC or Mac with the AIR runtimes. The AIR installer will handle setup and will add your application to menus and desktops too.

DO THIS... BUILD AIR APPLICATIONS IN HTML AND JAVASCRIPT

Adobe AIR isn't just for Flex applications. As it's built around the open source WebKit browser engine, it's also suitable for AJAX-style HTML and JavaScript apps. You can use JavaScript calls to work with a target machine's local file system, so your code doesn't have to rely on a permanent internet connection. You can also use CSS to style your application, giving it the look and feel you want. The AIR SDK is designed to work with any HTML editing tool.



Adobe's online documentation for AIR shows how to use the Dreamweaver CS3 plug-in.

Develop Vista Sidebar gadgets

Use familiar web development techniques to add new gadgets to the Windows Vista Sidebar. *Simon Bisson* shows you how.

REQUIREMENTS

- **TEXT EDITOR**
  This should be HTML and XML aware – Vista's Sidebar gadgets are text files, so there's no need for specialised development tools.

INSIDE INFO

- **http://tinyurl.com/y65wzq**
  Most of the best resources in Windows development for working with Windows Vista Sidebar gadgets can be found on the MSDN web site. This includes the Windows Vista Developer Centre which helps with all aspects of Vista development.

- **http://microsoftgadgets.com/build**
  Microsoft has begun to close its MicrosoftGadgets.com site, with much of the content moved to Live.com and MSDN – you'll find useful links to help pages and forums on its Build page.

Microsoft currently (and somewhat confusingly) has three different ways of delivering gadgets. As well as the Windows Vista Sidebar, there are others designed to run on the Live.com web site and others still for devices that can display the Windows Vista Sideshow. Each has a slightly different programming model, though it is possible to write gadgets that can run on more than one of the explained platforms.

In practice, however, it's often easier to just build and distribute three different versions. Complete gadgets can be submitted to the Windows Live Gallery, which Vista uses to help you find additional gadgets beyond the bundled set of simple tools.

You can download gadgets from the Windows Live Gallery, or you can write your own. Like many of the other widget development platforms, Microsoft's Sidebar Gadgets are a mix of HTML, JavaScript and XML (along with a selection of JPEG images), all bundled up with a manifest file and delivered to your PC over the web. One key feature of the Vista Sidebar is the ability to either use a 'fly out' to show extra information that can't be shown in the limited space of the Sidebar, or to drag the gadget onto the desktop, where it can be used to display a larger format view with additional information. You'll find this approach works well for taking a master detail approach to a gadget — perhaps using one to host a form field and then displaying the results in a fly out.

BUILDING GADGETS

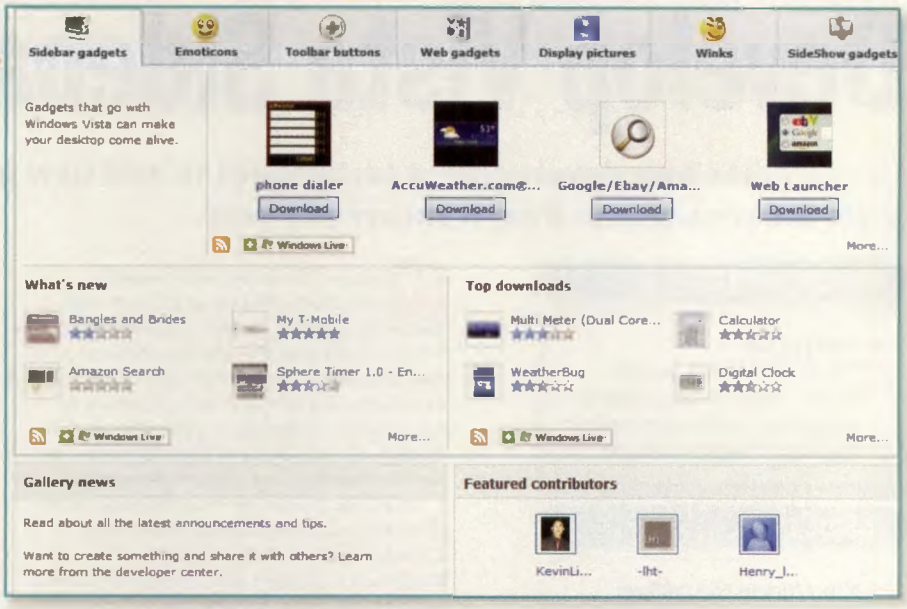
You don't need any sophisticated development tools to build a Vista Sidebar gadget — in fact, all you really need is a text editor. An image editor is also useful if you want to add graphics to your gadget. If you go into the gadgets folder on your PC (you'll find it in C:/Users/[UserName]/AppData/Local/Microsoft/Windows Sidebar/Gadgets), you'll see that downloaded gadgets come as a loose collection of files, with an HTML file for the main body of the gadget, perhaps another to handle settings, some image files, a PNG file with a gadget icon, possibly some JavaScript libraries and an XML manifest. It's the XML manifest that holds everything together, describing just what's been included with the gadget, from icons to scripts.

It helps to know how the JavaScript and the HTML document object model work together when writing a gadget. As the gadget runs from a single HTML document, you'll need to manipulate the contents of the HTML in order to display additional information, or change the look of the gadget when information has changed.

One useful feature of a Vista Sidebar gadget is the ability to access system information. Microsoft has given the gadget API plenty of system level access — albeit mostly in read-only format. You'll find the gadget SDK takes advantage of the WMI management features built into Vista, exposing them through JavaScript objects and methods.

We'll take advantage of these features to write a gadget that will monitor the amount of data stored on a PC's hard disk, showing the information as a number and as a simple bar graph. While Vista lets you run multiple copies of a gadget, ours will just work with a single hard-

You don't need sophisticated development tools to build Microsoft Vista gadgets — in fact, you only need a text editor and an image editor.



Graphics tools like the free Paint.NET make it easy to create PNG image elements.

coded drive letter, and will then show the total size of the disk, the space used and the available free space as a bar graph. We'll write the code so a settings page can be added in the future, allowing the gadget to work with more than one drive.

DEVELOPING A FREE DISK SPACE VIEWER

Start by going to the Gadgets folder we looked at earlier and create a new sub-directory, giving it the name apc.gadget. This is where we'll build our gadget. You can use any text or HTML editor to create gadget files — we'll be using Microsoft's Expression Web HTML editor to build our HTML and JavaScript gadget file and the crucial XML manifest.

We'll first build our gadget to work with just one drive letter, to prove that it works before adding custom settings. In your HTML editor, create a new document called apc.html. Now add the following code to the page:

```
<body onload="setContent()">
<span id="gadgetContent" style="font-family: 'Segoe UI'; font-size: 7pt;"></span>
<span id="barGraph"></span>
</body>
```

This is where our gadget's JavaScript will display content. We're using two spans — one for the gadget text, and one to display a CSS-generated bar graph to show how much disk space has been used. We're also calling a JavaScript function as soon as the gadget loads, which will display the results of our disk space query in our gadget.

ADDING JAVASCRIPT

We can now start to add JavaScript. Create a <head></ head> block in your HTML, and add a script block. Our script is going to be relatively simple, with only one function. Start the script with the following code.

```
<script type="">
```

This is where we use the gadget SDK's Windows API calls to extract information on our hard drive

```
var currentDrive = System.Shell. drive("c");
var strDrive = currentDrive. driveLetter;
var usedDriveSize = (currentDrive. totalSize - currentDrive.freeSpace);
var percentageFree = Math. round((currentDrive.freeSpace/ currentDrive. totalSize) * 100);
var strTotalDriveSize = "Size (MB): " + currentDrive.totalSize;
var strFreeDriveSize = "Free (MB): " + currentDrive.freeSpace;
var strUsedDriveSize = "Used (MB): " + usedDriveSize;
var strPercentageFree = "Percent Free: " + percentageFree + "%";
```

from Windows. First we set the drive letter we're querying to C. Next, we'll set a string to the current drive letter (this isn't strictly necessary for a gadget that only works with one drive, but we're writing code that can be changed later to support more drives). The next line of code uses the current Drive collection to calculate the disk space being used at that time, and then calculates the available free space as percentage of the disk size. We'll then set a series of strings to the current disk size, the available space, and the disk space currently used, as well as the percentage of disk space that's currently free.

DISPLAYING TEXT

Once we've got the information we need, we can display it in our gadget. Use the following code to do this:

```
function setContent() {
```

> ONE USEFUL FEATURE OF VISTA SIDEBAR GADGETS IS THE ABILITY TO ACCESS SYSTEM INFORMATION

THEORY... CODING DESKTOP GADGETS

Desktop gadgets and widgets are one way of bringing the internet to the desktop without using a browser. Like Microsoft's ill-fated ActiveDesktop, they use window-less browser implementations to render HTML on the desktop. Unlike ActiveDesktop, Vista's gadgets behave much like individual applications and take advantage of Vista's new desktop composition tools.

It's not surprising that gadgets use the same programming techniques as web browsers — and take advantage of many of the JavaScript tricks used with AJAX. You'll find that tools like ASP.NET's AJAX extensions can add extra features to your gadgets — and can give them much more interactivity. Future Windows web programming technologies will also work in gadgets, so expect to see Microsoft's WPF programming framework along with Silverlight appearing in more complex gadgets. Design house Frog Design and Yahoo! showed a set of WPF-based gadgets at MIX 07 that offered much the same functionality as Yahoo!'s existing desktop messenger tools.

Other gadget platforms include Yahoo! Widgets.

You need to provide an XML manifest file for your gadget. This manages installation and displays an icon and a description in the Gadget gallery.

gadget.xml | pcplus.html | settings.html

```
<?xml version="1.0" encoding="utf-8" ?>
<gadget>
    <name>APC Disk Space Indicator</name>
    <namespace>APC</namespace>
    <version>1.0.0.0</version>
    <author name="Your Name">
        <info url="www.example.com" />
    </author>
    <copyright>&#169; 2007</copyright>
    <description>APC tutorial gadget</description>
    <hosts>
        <host name="sidebar">
            <base type="HTML" apiVersion="1.0.0" src="apc.html"/>
            <permissions>Full</permissions>
            <platform minPlatformVersion="1.0" />
        </host>
    </hosts>
</gadget>
```

HANDY TIP

As it stands, our gadget is rather plain, with just a simple white background. While we can use the Sidebar's opacity feature to set transparency levels, we can also use a PNG file with a transparent background to add a more appealing look and feel. You'll need to add some CSS to control how the gadget is displayed, along with a snippet of code inside the body tag to display your background image.

```
gadgetContent.innerText = "Data for " +
strDrive;
gadgetContent.innerText = gadgetContent.
innerText + "\n\n" + strTotalDriveSize;
gadgetContent.innerText = gadgetContent.
innerText + "\n" + strFreeDriveSize;
gadgetContent.innerText = gadgetContent.
innerText + "\n" + strUsedDriveSize;
gadgetContent.innerText = gadgetContent.
innerText + "\n" + strPercentageFree;
```

We'll use the HTML document object model to populate our gadgetContent span. We could set the inner Text property in one fell swoop, but it's easier to read (and debug) several lines of code. Don't forget to append each additional string to gadgetContent.innerText — otherwise you'll just overwrite everything we've done!

A CSS BAR CHART

We now want to draw a simple bar graph on our gadget, displaying the percentage of the disk that's currently free. We'll use some CSS for this — the fewer files in a gadget the better. First, we'll jump to the top of our HTML document, and between the <head> and <script> tags, we'll add some CSS formatting. Something like this will work:

```
<style type="text/css">
.graph {
border: solid 1px black;
}
.bar {
background-color: #C0C0C0;
}
.bar div {
border-top: 2px #FF5050 solid;
background-color: #FF0000;
border-bottom: 2px #CC0000 solid;
}
body {
width:120;
height:140;
}
</style>
```

As we're using a single cell table to display our bar graph, we'll need to style both the table and the bar. The first block of CSS just defines the outline of our table. The next block will be used to define the format of the cell where we'll draw the bar, giving it a grey background. The next gives us the bar itself, defining it as a red block with a lighter top and a darker bottom for a simple 3D effect.

Finally, we'll set the size of our gadget itself — a svelte 120 x 140 pixels. We can now finish off our setContent function by adding some HTML to the barGraph span. This will draw our simple chart. It will then close off our script block:

```
barGraph.innerHTML = '<p><table
class="graph"><tr><td width="100"
class="bar"><div style="width:' +
percentageFree + '%"></div></td></tr></
table></ p>';
}
</script>
```

To draw the bar graph we'll set the innerHTML property of the barGraph span we put in our HTML. The graph is drawn using the CSS we defined earlier, using our calculated free space to set the width of the bar.

MANIFESTING A GADGET

Our gadget is now ready to run, but we'll need to add a gadget.xml file to the apc.gadget directory to finish the job. This is a manifest and contains details about our gadget that will be displayed in the local Gadget Gallery on our PC. Here's our manifest file:

```
<?xml version="1.0" encoding="utf-8" ?>
<gadget>
<name>APC Disk Space Indicator</name>
<namespace>apc</ namespace>
<version>1.0.0.0</version>
<author name="apc workshop"> <info
url="www.apcmag.com" /> </author>
<copyright>&#169; 2007</ copyright>
<description>APC tutorial gadget</description>
<hosts>
<host name="sidebar">
<base type="HTML" apiVersion="1.0.0"
src="apc.html" /> <permissions>Full</
permissions>
<platform minPlatformVersion="1.0" />
</host>
</hosts>
</gadget>
```

Once it's added, open the Gadget Gallery and click on the 'APC Disk Space Indicator' icon. This will add our gadget to your sidebar. Testing the gadget is easy — each time you make a change, just remove it from the sidebar and click on the icon in the Gadget Gallery to load the latest version in use.

You may want to spruce up the design a little — perhaps by adding a background or a logo. Widgets always get more attention if they look pretty — if something's going to sit on your desktop, you don't want it making your eyes bleed every time you glance across. For Vista widgets, any background files are best delivered as transparent PNG files.

Once your gadget is complete you can share it with other users by wrapping all the files in a ZIP archive and replacing the .zip extension with .gadget. Windows Vista will now install the files in the appropriate directory at a click.

Control Linux remotely

Get remote access for faster Linux use, and there's no need to stay with your PC, says *Paul Hudson* and *Graham Morrison*.

REQUIREMENTS

- **A LINUX DISTRIBUTION**
  You can download Fedora from the Fedora site at **http://fedoraproject.org/**. Fedora 7 was also on the September 2007 *APC* DVD.

Linux offers various solutions for working remotely. We'll be looking at these, with particular focus on VNC and SSH. Both KDE and Gnome have built-in remote desktop systems, but both are really just pretty interfaces around the same VNC core.

To get started, go to the machine that you want to connect to and click System > Preferences > Remote Desktop, then make sure all four checkboxes are checked. Enter a password in the box, then start up a terminal and run 'ifconfig': this will determine your IP address. Note it down somewhere — because it's time to scoot over to the remote machine.

From the remote machine, open up a terminal window and type this: 'vncviewer 10.0.0.1:0', where you need to replace the 10.0.0.1 with the IP address of the remote machine. The Gnome VNC front end usually tells you that you can connect directly to the host name of a machine, but we've had mixed experience with that, so it's easier just to type the IP address in. You'll be prompted for a password, then... nothing. What's wrong?

When I said the checkboxes should be ticked, the third checkbox down only allows VNC connections when explicit per-connection permission has been granted by you, so you need to go back to the server and click the 'Allow' button to continue. Back on the client again, you'll find that VNC has connected successfully and you'll see the remote screen working just fine.

X MARKS THE SPOT

The server part to VNC is almost identical to the functionality contained within the X Windows system — the windows manager native to nearly every Linux installation. X Windows, also known as X11 or simply 'X', is the system responsible for drawing the screen and the windows, as well as handling the mouse and keyboard.

X was developed to be implemented across a network, using relatively cheap terminals with little processing power connected to an expensive Unix server sitting in a laboratory. Rather than filling the network bandwidth transferring the raw image data of a screen redraw, X uses simple objects that both the client and the server understand. It could be the instruction to 'draw a square', or 'draw the menu', for instance, and as a result very little bandwidth is consumed.

Unlike single other examples of a client/server configuration, with X it's the user's machine that's the server and the remote machine that's the client. This could seem counter-intuitive, as applications running on your X desktop are being executed on the remote machine that's acting as the client. But this is because it's the local component interacting with your local video card, keyboard and mouse that's considered the 'server', while clients connect to your local server and feed it chunks of the screen to display. The only problem is latency across the internet.

Launching a browser as another user can give you access to a network which only the new user has access to.

HANDY TIP

There are several projects out there that provide VNC-like functionality and give you a little choice in Linux. A popular one is NX, and it's interesting because it includes strong encryption out of the box. It has super-low bandwidth requirements and works on many platforms. The only problem with NX is that the real free software projects are having to code their own versions of the software to be able to be bundled with Linux distros.

VNC lets you enter only a nine-character password by default, so mix in numbers and characters.

VNC requests permission for each connection, so you always know who is connected.

ONE OF THE MAIN ADVANTAGES FOR A SINGLE MACHINE IS THAT YOU CAN RUN MORE THAN ONE X DESKTOP AT ONCE

LOCAL SESSIONS

One of the main advantages for a single machine is that you can run more than one X desktop at once. Each new instance is a completely new session. VNC takes advantage of this by creating a new X session on the remote machine, and you connect to this through the VNC client. But you don't need to use VNC to take advantage of the remote control possibilities built into X.

You can launch remote applications relying solely on the functionality built into X. First, authenticate the IP address of the local machine on the remote machine using the 'xhost' command — 'xhost +192.168.0.18', for example; this is required before any incoming connections will be allowed. The next step is to manipulate the DISPLAY environment variable. Type 'env |grep DISP' from the command line to see what it contains – it may not even exist. The contents of DISPLAY informs X where to send the display data for any application you're launching. It takes the format of 'IP Address:Screen number'. The default display is usually set to 'localhost:0' — the first screen on the local machine. This is why VNC uses a screen number of 1 by default — 0 is already taken by the main display. It's even possible to configure VNC to access screen 0, thereby sharing the display with the person sat at the remote machine. Tell the remote machine where to send the display data by typing 'export DISPLAY=192.168.0.5:0'. This will either update or add the DISPLAY environmental variable and you will be able to use applications on the remote machine locally by typing the command you want. This method is insecure; xhost authentication is easy to break and your data is transmitted without encryption. A third party could capture the network packets and play back your desktop session. Fortunately, the secure shell (SSH) is available to use.

WORKING REMOTELY

You just need to allow it on the remote machine. Open the 'sshd. conf' or 'sshd_config' file, found either in the '/etc' or '/etc/ssh' directories, and add 'X11Forwarding yes' on a separate line.

HANDY TIP

Gnome's standard remote desktop connection system is very simple, but your distro will almost certainly have a stack of other VNC options available to you. The most common alternative is called TightVNC, so named for its use of encryption as standard. Most of the alternatives are improvements for power users, because they open up a world of configuration options, so if you're serious about VNC, give them a try!

Restart the server (/etc/inid.d/ssh restart), and on the local machine, connect to your remote account with SSH using the '-X' flag. Using the same IP address as before, we'd need to type 'ssh -X 192.168.0.5'. It's then a simple case of typing the name of the application you want to run. You could type 'firefox' to launch the remote version of the web browser onto your local machine, which is an excellent way of accessing any intranet only the remote machine might have access to. SSH will compress and secure the data automatically and pipe the X calls through its own connection, which is a much safer alternative to ordinary remote X. And, because it compresses the data, latency will also be reduced much more than usual. apc

SPOTLIGHT ON... BASH VIRTUAL DESKTOPS

A graphical desktop isn't worth the bandwidth for many system administration jobs. But there is an alternative. SSH gives you command line access to your server from which you can change virtually anything. As you're only transmitting and receiving text, bandwidth is measured in bits and bytes rather than megabytes.

You can make your command line session feel familiar by looking at the command called 'screen'. It's the closest you can get to a virtual desktop manager for the command line. After typing 'screen' and pressing 'Rtn', it will start. Features of 'screen' come from a keyboard shortcut, and each starts by holding down the 'Ctrl' and 'a' keys down at the same time. Press 'Ctrl' and 'a' together, followed by 'c' to create a new window – the 'screen' equivalent of a virtual desktop. You can flick between windows using the 'n' and 'p' key shortcuts for next and previous screens, or even select the screen you want from a list with the '"' key. You can also split a screen into several sessions. Press 'S', and a border will be drawn across the middle of the screen. Switch to the lower session by using the 'Ctrl' and 'a' keyboard shortcut followed by tab. You can then flick between windows in the same way you can within a single window. The best part for the system administrator is that 'Ctrl' and 'a' > 'd' will detach your whole session and leave it running in the background; you can return by starting 'screen' with the 'screen -r' command.

Silence your PC, part 1

Is your PC making a racket? *James Morris* finds out how to make it whisper rather than shout.

WHAT'S COVERED

- **OVERVIEW**
  We show you ways to reduce your PC's noise level for free – and look at component upgrades that reduce noise levels.

REQUIREMENTS

- **A PC**
  Most PCs are a bit noisy, but systems of between one to four years in age can be some of the noisiest. Any computer which is destroying the calm of your environment would be an ideal candidate for this tutorial.

If your system has temperature-controlled fans, you can use BIOS settings to reduce the spinning speed.

The increasing clock speeds of both processors and graphics cards mean more heat needs to be dissipated, so more fans will be running at faster rotational speeds, which in turn leads to greater noise. You don't have to live with the noise a bog-standard PC can make. A judicious choice of components — or even just some BIOS tweaks and software utilities that will cost you nothing — can reduce the noise a modern PC often produces.

KNOW YOUR NOISE

Firstly, we need to consider which components are making the noise in a system. Essentially, the culprits are anything mechanical that spins — so hard drives, optical drives and, of course, the fans used for providing cooling airflow. These components usually have a sound emission rating in decibels. For example, most hard disks are now rated under 30dB when idle, but some still output more than 30dB when seeking.

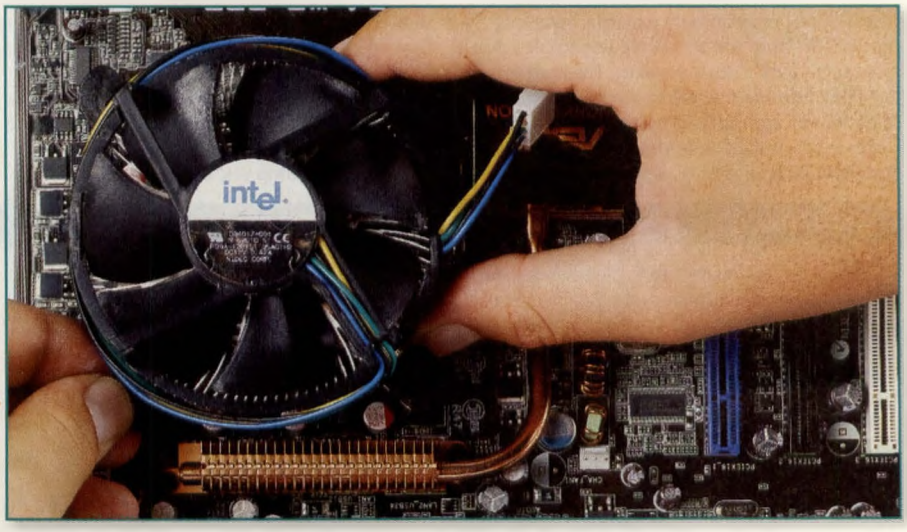
Fans can also vary greatly, with quiet ones producing under 15dB but standard ones producing as much as 50 per cent more noise. Generally, the larger the diameter of the fan, the less rapidly it must spin to provide the same airflow. Better design can also provide the same airflow at a lower speed, and quieter bearings can also contribute. But since rotational speed is such a major factor, the smaller fans on graphics cards and processor heat sinks are often the source of the most noise.

Make sure your PC isn't making your life difficult in the first place. For example, some PC chassis use plastic rather than rubber feet and may not sit entirely firmly on a desk. Use an appropriately sized rubber mat to prevent vibration. Don't push the case right up against the wall so that there is very little room for air to escape from the back, preventing airflow. If the chassis has side or top vents, prevent these from being blocked in any way.

Dust build-up can be caused by a PC sitting on the floor, clogging air vents and fans, which is likely to make them work harder to provide the same airflow — or even cause extra vibrations. Turn off your system and carefully vacuum the dust from the vents. If the interior is very dusty, it's worth cleaning this out as well, although be very careful not to use a powerful vacuum cleaner which risks dislodging internal components or causing other damage. Next, check your cabling is secured out of the line of airflow and well away from fans, using cable ties if necessary to bundle and fasten down your wiring. Finally, ensure the sound-producing components are all properly screwed down, as loose screws can also cause vibrations.

FIGHTING THE BIOS

Your next job is to take a trip into the PC's BIOS. Many recent motherboards offer temperature control for any attached fans, and not every PC manufacturer ships their systems with this enabled. Depending on your motherboard make and model, you could find the speed of the processor heat sink fan can be linked into its temperature, and the chassis fans to a sensor on the motherboard. These provisions often have fancy names, such as Shuttle's Smart Fan or ASUS's Q-Fan, but they essentially do the same thing. Although the precise workings may vary



Ensure your cooling system is carefully installed to achieve the right temperatures — mistakes could prove costly.

Fans on graphics cards can be particularly noisy, as they have to spin fast to provide airflow.

HANDY TIP

It's not recommended that you run any CPU hotter than 65°C, although even this can cause damage over prolonged use. If you're experimenting with reducing fan speeds, keep temperatures below 60°C even under load. The 'A' weighting used in sound level measurements emphasises noises in the 6kHz region, as the human ear is most sensitive to these. For this reason, noises of lower frequencies will be less intrusive.

slightly, the controls usually revolve around setting a threshold temperature. Below that temperature, the fan will be in low power state and will operate at a reduced speed, but once the temperature rises above the line it will switch to full speed for maximum cooling, but some BIOS will offer more elaborate control with a variety of fan speeds and temperature levels available.

Be careful when finding the optimal configuration. Set the temperature too low and your fans could be permanently at full speed. Set it too high and you risk system instability, particularly with a hot-running CPU such as a Prescott-generation Pentium 4. You could also find that if the temperature hovers around the threshold, the fan speed will be revving up and down.

If you don't have any control over your system's fans, it's worth taking the side off the chassis and investigating how many of them your PC has. If you're not running a powerful CPU or graphics card, and don't often perform intensive tasks, you could consider reducing the number of operating fans. The PSU will draw air out the back of your PC with its fan, so you may be able to get away without a separate exhaust fan. We'd still recommend leaving the front fan operational, otherwise there is a significant risk of your processor overheating. If you do experiment with disconnecting fans, watch your PC doesn't overheat.

CLOCK TACTICS

Since one of the reasons for the massive amounts of heat produced by modern PCs is the frequencies of the CPU and GPU, reducing the clock speed of either could allow you to run your fans more slowly. As a result, the same tools that you can use for tuning the performance of your system by overclocking it can also be used to reduce its heat output by underclocking it (as well as control fan speeds in some cases). On the one hand, underclocking your processor is a bit of a waste of the money you spent initially. But if you purchased a powerful CPU for evening gaming, but also use the PC for less strenuous work during the day, it could make sense.

Switching your clock speeds using the BIOS a few times a day would be a chore, but there are software utilities capable of the same end result, SysTool (**www.techpowerup.com/systool**) is one of them. We'd recommend only using this if your motherboard is correctly detected when you first run the software after installing it. Then head for CPU Overclocking and press the Read button. Your PC's data should be loaded — if any of the information detected looks wrong (for example, you're getting an AGP Bus frequency reading when your system is PCI Express-based) then don't go any further. Like all non-standard changes to underlying hardware clocks, there is a potential here to make your PC unstable. If the detected bus frequencies look correct for your hardware, you can reduce the FSB using the slider, then hit Write for the changes.

However, underclocking is only worthwhile if the end result is a cooler-running CPU, allowing you to run your fans more slowly. So its usefulness depends on being able to control your system fan speed with temperature thresholds in BIOS. Under HDD Acoustic Management, you can choose your hard disk's slower, quieter mode, assuming it has one. You can also force Enhanced Intel Speed Step and AMD 64 Cool'n'Quiet to select lower clock multipliers, if your processor supports this. Also, you can access your hard disk low-noise settings, if your model supports this.

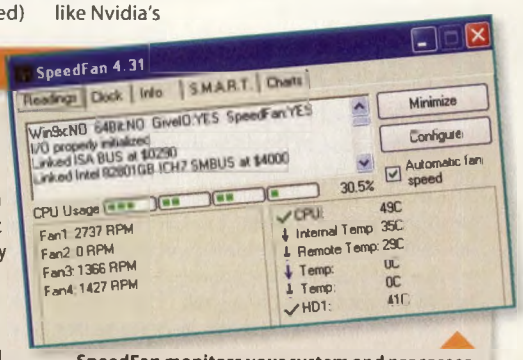
The graphics card GPU is also a candidate for underclocking, but this is only worthwhile if you can reduce fan speed as a result. Graphics cards, due to size constraints, still generally use rather small fans which have to run quite fast to provide sufficient airflow for cooling. Their clock speeds are growing too, but most of this is aimed at 3D acceleration. Mobile graphics include technology to operate at a lower frequency when not running 3D applications, like Nvidia's

DO THIS... MONITOR YOUR PC TEMPERATURE

If you're making changes to your fan speeds and processor clock, it's a good idea to keep an eye on system temperatures as you use the PC within Windows, particularly the CPU. One of the neatest utilities for this purpose is SpeedFan (*www.almico.com/sfdownload.php*). Once you've installed this utility, it detects the temperature sensors on your motherboard, processor and hard disks automatically.

Add a shortcut to SpeedFan to your Startup folder to make the utility load on system boot.

By default, this will add a regularly refreshed readout of your CPU temperature to the System Tray, but you can choose to show the readings from any other temperature sensor instead. When fully maximised, SpeedFan also tells you how fast your monitored fans are rotating. This is extremely useful in working out what is making the most noise, and SpeedFan even has some ability to control the fans on certain motherboards. Unfortunately though, it can't monitor and control your graphics card.

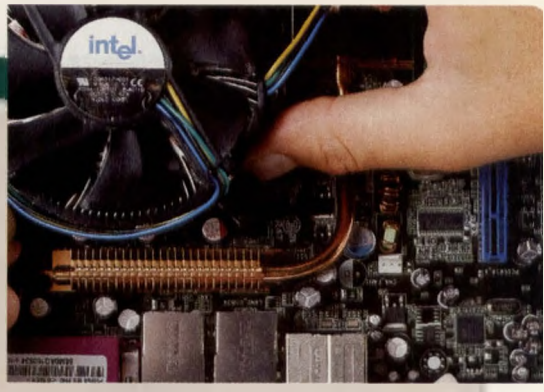


SpeedFan monitors your system and processor temperature, and can control the associated fans.

SPOTLIGHT ON... ARE PROCESSORS GETTING COOLER AGAIN?

Manufacturers have started to realise heat output can't increase. From the size of heat sinks necessary to keep a modern CPU cool, compared to the set of fins 10 years ago, it's obvious a limit had been reached.

Fortunately, whereas Intel's Pentium 4 and Pentium D pushed well beyond 100W thermal design power (TDP) in their last iterations, the dual-core Core 2 has dropped back down to a much more manageable 65W. The quad-core versions remain hotter, but Intel's soon-to-arrive 45nm production process is likely to take these down a notch. The top members of AMD's current processor family have a thermal design power of 125W, but its recently announced Phenom will mostly drop to 89W even in quad-core versions, with many dual-core models specified at 65W and below. Since cooler computing means quieter computing, things are looking up for the silent PC.



Intel's Core microarchitecture chips run much cooler.

PowerMizer. But many desktop cards don't. SysTool includes facilities to change the frequency of ATI and Nvidia GPUs and their associated memory.

ATITool is another useful utility if you have an ATI graphics card. It lets you reduce clock speeds and set a variety of different fan speeds linked to GPU temperatures. Linked with a bit of GPU underclocking, this can keep your graphics card noise low — and you can save profiles so you can switch back to full power if you need the full capabilities of your GPU. For Nvidia graphics cards, try RivaTuner (**http://tinyurl.com/2kafsf**). It has similar capabilities to ATITool, but is less intuitive to use.

WHEN HARDWARE BEATS SOFTWARE

Turning on features like temperature control for your system fans can have a noticeable effect on noise emissions. But if your system is already properly configured, there's a limit to how far this can go. So we'll also look at some cheap and relatively easy hardware upgrades that will have a much more significant effect.

A rule of thumb is that larger fans don't need to spin as fast as smaller ones, meaning bigger is usually quieter. So if you're building a new PC, specify a chassis that can accommodate 120mm fans rather than 80mm or 92mm ones. If your chassis can accommodate 120mm fans but the manufacturer fitted something smaller, you could consider an upgrade to 120mm. However, even if your chassis will fit 120mm fans, chances are it came with standard noisy ones. For not much of an outlay, you can make a serious dent in the din your PC makes.

BIGGER FANS ARE QUIETER

Take the side off your system, power it up and try to find where the majority of the noise is coming from. Unless you bought a premium system from a bespoke builder, it's likely the system fans will be causing most of the noise.

Changing system fans shouldn't be a problem for you — in theory. The rear exhaust fan, if you have one, will almost always be readily accessible with the side panel removed. The fixing screws will be on the rear of the chassis too, making them easy to loosen. But the accessibility of the front fan will depend on your chassis' design. The fan could be obscured behind a front hard disk enclosure, which may need to be removed. The fixing screws will almost certainly be hidden behind the front fascia, which will also need to be removed.

At this stage, you have a choice of using your old screws for the new fans, or you could opt for vibration-reducing rubber mounts. A few fan kits, such as SilenX's iXtrema range, come with these as standard. But you can also buy them separately, as in the Amacrox Rubber Suspension Kit, which includes eight rubber lugs for attaching two fans without screws. The lugs stop the fan vibrating against the case, which will have a small but noticeable effect on system noise.

More important than vibration-free fixings, however, is your choice of fan. There are lots of system fans aimed at noise reduction, but a quiet blower isn't much good if it achieves its low noise emissions by not shifting much air. Aside from risking system overheating, this could cause other fans to work harder, which won't make for a quiet PC.

Dutch company Sharkoon's Silent Eagles are acknowledged by PC builders as being among the best fans around, with the Silent Eagle 1000 running at 1,000rpm and the 2000 at 2,000rpm. But surprisingly, when we checked for their local distributor, we couldn't find one. Some online retailers stock them, however, so a web search should locate some. We recommend the 2,000rpm Silent Eagle 2000 version, which isn't much noisier, and is much more effective at moving air.

Another manufacturer to look out for is AcoustiFan, with very good performance across its range. However, its fans aren't the cheapest, especially the DustProof models that sport sealed motors. If you're on a tight budget, Akasa's Amber 92mm is pretty quiet and is relatively inexpensive, making it a cheap way to cut noise if your system doesn't support 120mm fans. However, we found Akasa's 120mm model a tad noisy.

Some of the fans we've mentioned come with resistor cables that step down the voltage, which in turn reduces their speed. For example, AcoustiFan's basic C-series range can run at either 12V (2,000rpm) or 7.5V (1,300rpm). The latter setting is quieter but doesn't shift so much air. So, if you do choose the lower setting, use monitoring software such as SpeedFan (**www.almico.com/speedfan.php**) to keep an eye on system temperatures.

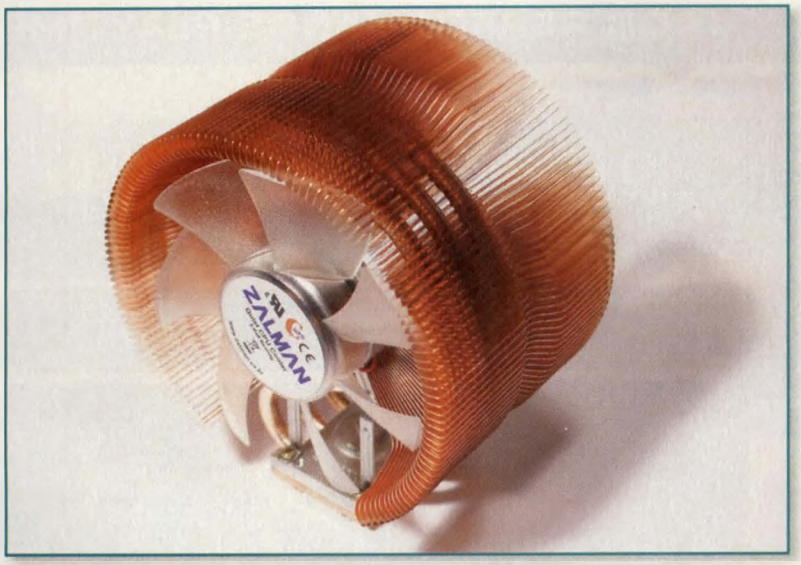
Even fixed-speed fans can be run at lower speeds — if your system BIOS offers speed

DO THIS... COOL YOUR GRAPHICS

Your graphics card is likely to be another source of annoying sound, as GPUs are usually fitted with small fans and produce a fair amount of heat. If yours is emitting an annoying whine but is otherwise relatively powerful, consider changing the cooling. Arctic Cooling makes a range of VGA coolers, although the latest offerings from Nvidia and ATI are not currently supported.

Also, this could be the excuse you need for that graphics card upgrade you've been putting off. Some manufacturers fit Arctic Cooling's products to their cards, such as Inno3D, PowerColor and HIS, so watch out for these as they'll be low-noise. For the ultimate in silence, there are graphics cards with entirely passive cooling, so they make no noise at all. You won't find the greatest graphics chips used, but there are products based on Nvidia's GeForce 8600GTS, such as MSI's NX8600GTS-T2D256EZHD. So if you're not after the highest frame rates, you can cut this sound source out entirely.

If your graphics card is noisy but otherwise fine, consider fitting a quiet cooler.



The CNPS9700 LED is expensive — but almost silent.

Sharkoon's Silent Eagle fans offer efficient, quiet cooling — for a very reasonable price.

control of fans attached to motherboard headers, you can link speed into temperature. You can also buy resistor cables separately, such as Zalman's ZM-RC56. This reduces the 12V supply to 7V, cutting fan speed by about 40 per cent. For finer speed variation, try a fan controller. Zalman's Fan Mate 2 is the cheapest option, but only provides control for one fan. Controllers for three or four fans are available that slot into a 5.25in bay, so you can find the optimum balance between system temperature and fan noise.

HEAT SINK FANS

Continuing the general theme of fan size, another key source of noise is your processor heat sink fan (HSF). Reference HSFs usually incorporate fans smaller than 80mm. However, there are alternatives with fans as large as 120mm, which are generally quieter. Some of these aren't supplied with fans, leaving you to choose the quietest you can find. Thermalright's Ultra-120 comes with clips for 92mm and 120mm fans, and CoolerMaster's massive GeminII can fit two 120mm fans that draw air away from surrounding components too.

HANDY TIP

The motherboard itself can often be the source of noise. If this has an active fan cooling the chipset, it's likely to be very small – typically 40mm. This can be replaced by a quiet alternative, although doing so is not as easy as swapping system fans or your HSF.

Efficiency is more important than size, and this is down to the heat sink design as much as the fan. If the sink is more efficient at drawing heat away, the fan doesn't need to run so fast. You should also consider the logistics of fitting a new processor HSF. You may not be able to fit some of the larger ones in your PC, and a number of tower coolers need you to remove the motherboard to fit a custom baseplate for mounting. You should also ensure you carefully wipe the processor heat spreader clean and apply new thermal interface material (TIM) before fitting a new HSF.

If you're using an Intel LGA775-based processor, one of our particular favourites is Arctic Cooling's Freezer 7 Pro. Although it only uses a 92mm fan, the fact that this HSF can keep a CPU around 10°C cooler than Intel's reference heat sink under load means its fan never needs to spin as fast. At such a keen price, this is one of the cheapest ways to reduce noise — and it's extremely easy to fit. There are quieter alternatives, but most are three times the price.

For AMD processor users, Arctic Cooling's Freezer 64 Pro is a similar price to its LGA775 sibling, and just as effective. However, its mounting clips are a little stiff and, although it doesn't require motherboard removal, it can only be fitted according to the orientation of your processor socket, so it could end up blowing air up or down your motherboard rather than out the back. Instead, we'd recommend Zalman's CNPS9700 LED, which comes with a Fan Mate 2 so you can turn the fan right down. Even at its lowest 1,250rpm setting, the Zalman is a very effective cooler — and almost completely silent. You can use it on LGA775 systems too, but the motherboard will need to be removed first.

Nearly all these upgrades are affordable, easy to do and will reduce your system noise. Next month, however, we'll look at the most extreme noise-reduction options, including water cooling systems capable of rendering your PC almost entirely silent.

SPOTLIGHT ON... QUIET POWER

Once you've upgraded your fans, you may realise that there's one chassis-related blower you can't replace – the one inside your power supply unit (PSU). Some PC manufacturers don't even fit an exhaust fan, relying on the PSU's cooling to draw air out the back of the system, so this can be another source of noise.

However, opening up your PSU and fitting a quiet fan is not to be attempted. Ever. Even unhooked from the mains, a PSU has capacitors that could contain fatal amounts of charge. You can buy fanless PSUs, but we wouldn't recommend them either. These days, if your CPU overheats it simply throttles down, but a power supply can't do this, and if it overheats it could fry components or even catch fire.

Instead, consider replacing your PSU with a premium quiet model. Match or exceed your current PSU's wattage rating to ensure your PC's power requirements are met.

Nesteq's Nova puts the power supply outside the chassis.

downtime

HIGH PERFORMANCE PLAYTIME

Sony Ericsson W580i

We're still waiting for a phone that lets us BPay by drop-kicking it across the room — but meanwhile, Sony has come up with a compromise — a phone that lets you shuffle your music playlist by shaking it. Give the W580i Walkman phone a shake and it will shuffle your playlists stored on the 512MB Memory Stick Micro (expandable to 2GB), so if you get sick of Killing Heidi's *Weir* you can always mix it up with some Shannon Noll. It also includes a pedometer for counting steps, and other fitness functions like a calorie counter.

CONTACT	Sony Ericsson
ONLINE	www.sonyericsson.com.au
PRICE	$549
VERDICT	★★★☆☆

Belkin TuneStage 2

Here's a way to instantly ingratiate yourself to your hosts at a dinner party. Take along this Bluetooth adaptor, connect the receiver to the nearest home stereo and you can play your music over the stereo speakers. Belkin's pushing the idea as a way of turning your iPod into the ultimate remote control, which we're in favour of. In fact, as far as we're concerned, the more things you can connect the iPod to, the better. This thing can also hook up to your Bluetooth MP3 phone. Keep in mind that Bluetooth A2DP (advanced audio distribution profile) is required.

CONTACT	Belkin
ONLINE	www.belkin.com/anz
PRICE	$249.95
VERDICT	★★★★☆

RHTG800

There's nothing we love more than household furniture with electronics in it, even if it's a home-brew Shuttle box for watching DivX. And if the furniture has 5.1 channel surround sound speakers and a digital speaker and receiver then we're filling out our chequebook. This one's a TV stand, but hidden inside the shelves are the components of an HDMI-equipped Sony home theatre system. It's designed to match a Bravia big-screen TV, hence the snazzy black finish. What's that? You're still stuck in 1998 with your 68cm CRT? We'll pretend we didn't hear that.

CONTACT	Sony
ONLINE	www.sony.com.au
PRICE	$1,499
VERDICT	★★★½☆

Lexar Lightning

Getting sick of Vista telling you your USB key isn't ReadyBoost-compliant? These Lexar USB drives are fast enough for Vista, but the coolest thing is they double as portable operating environments. Using the supplied PowerToGo software, you can load standard Windows apps and run them straight from the drive. You can also attach a lanyard to hang them around your neck — it's pretty fashionable you know. If you're at a party, just don't say it's where you keep your "important files and system restore images". Put them on your memory card with the Japanese game show videos.

CONTACT	Lexar
ONLINE	www.lexar.com
PRICE	$180
VERDICT	★★★☆☆

Digital Photo Frame

If the rumours are true, Bill Gates has wall-sized digital photo frames in his mansion — showing Vista logos with the Ken Burns effect, perhaps? Our budget doesn't stretch that far, so the closest we can get is this 10.4in digital frame with MP3 and DivX playback. We'd like to say it features scrolling green pastures of XP, but really it has a photoshopped picture of Linus Torvalds beating an effigy of Steve Jobs for crimes against operating systems. Sorry, what? The iPhone isn't 3G, and enthusiasts can't develop for the OS? You showboating little... sorry, sorry... enjoy your dinner party.

CONTACT	Also Technology
ONLINE	www.alsotech.com.au
PRICE	$399
VERDICT	★★★½☆

Sanyo Charger

In the future, everything in the world will run over USB — mark our words, it will happen. Case in point: the USB ashtray/air filter we brought you a few months back. If that wasn't practical enough for you (there's something wrong with you), then try this USB battery charger. You plug it into your PC or laptop and charge your batteries (Sanyo's rechargeable 'eneloop' batteries only). Now you will never have an excuse for being without charged batteries morning, noon or night, so you can rest easy because your gadgets will be happy.

CONTACT	Sanyo
ONLINE	www.sanyo.com.au
PRICE	$29.95
VERDICT	★★★☆☆

B-Control Deejay BCD3000

Ever pictured yourself as a DJ but couldn't mix to save your butt? Perhaps you are a DJ looking for a way to ease the aches from lugging cases of vinyl. Look no further than Behringer's new BCD3000. With more knobs, sliders and lights than a spaceship control panel, it connects to your computer via USB and works with Traktor 3 LE to mix your MP3s. It integrates all the functions you'd expect from two CD players and a mixer into one unit, including automatic track synchronisation. In no time you'll be spinning tunes with one hand and waving to the crowd with the other!

CONTACT	Behringer
ONLINE	www.behringer.com.au
PRICE	$399.99
VERDICT	★★★★☆

TrackIR

There's nothing weird about bobbing your head around while playing video games. We've been doing it since the days of the C64, and now someone's actually encouraging it. TrackerIR translates your head movements into game commands, so when you're soaring above mountains in your airplane you can look out the window and admire the scenery, or peer over your shoulder so you don't cause a 10-car pile-up exiting the pit lane. It means you don't need virtual reality goggles, but you do clip a plastic thingy to your hat... so yeah, you'll still be keeping the blinds drawn.

CONTACT	Natural Point
ONLINE	www.naturalpoint.com
PRICE	US$179.95
VERDICT	★★★★☆

BioShock

APC UBER

Nick Race grabs his shotgun and a syringe full of Eve.

The game features truly outstanding design and attention to detail.

BioShock's storyline is much more immersive than your trad FPS fare.

Creepy... with a capital 'C'.

Top ten and top 100 lists of the 'Best Games Ever!' nearly always include my favourite game *of all time*: System Shock 2. It's been eight years since the showdown with Shodan, the errant, evil AI. As a sci-fi horror-themed game, set on a huge space ship circling a promising world where something has gone horribly awry, it was fantastic — a game where many film directors could learn a lesson or three. Atmosphere summoned in SS2 was beyond scary, with this player at least, often checking over his shoulder, just in case that scream or pained moan was for real.

BioShock is the 'spiritual successor' to System Shock — but forget the spaceship: this time the setting is deep, deep under the Atlantic in an art deco city built to house those whose dreams and work didn't match the aims of those above the waves. A utopia for the mad scientists, artists and free thinkers all in a compressed environment. This city, Rapture, is the new setting for a great romp through some truly outstanding design. The attention to detail in each level is outstanding, and the sense of being underwater — and trapped — is horrifying.

The story centres on a discovery — a sea slug that secretes stem cells, which can be then turned into many handy genetic modifications. This stem cell material, ADAM, was the lifeblood of Rapture after its discovery, but difficult to make — not to mention it eventually drives those who use it completely mad. Those modified with ADAM use a serum (to power the genetic changes that have been wrought) named EVE. With the difficulty producing ADAM, a recycling system was brought about: small girls, named Little Sisters, no longer quite human, are tasked with harvesting the ADAM from dead bodies, then turning the ADAM back into a useable form within their own tiny bodies. Gruesome.

CONTACT	2K Games
ONLINE	www.bioshockgame.com
PRICE	$89.95
✔	More atmosphere than a planet full of oxygen.
✖	Don't play at night.
VERDICT	★★★★★

The player comes in on a plane crash, swimming through the burning wreckage into a bathysphere, which brings them deep below the waves, and deep into a running war between the Splicers, the residents whose ADAM consumption has driven mad, the security system run by the builder of Rapture, Andrew Ryan and the Little Sisters (with their bodyguards, Big Daddies) who just want to harvest more ADAM.

The player is drawn deeper into the story and the intrigue by listening to recordings left around the city — various characters play out their thoughts, dreams and the history of Rapture, ADAM and the Little Sisters via these snippets, and the effect is great. Working through the storyline is a pleasure, refreshingly different from the usual rut: "here's your target and a machine gun, three-minute cut scene now slaughter till the end of the level" that FPS has fallen into.

You're equipped with an arsenal of everyday weapons, a pistol, machine gun, grenade launcher, chemical sprayer (for use with napalm, liquid nitrogen etc.) and crossbow, as well as a less traditional selection — a series of ADAM-granted powers fuelled by EVE, dubbed Plasmids. These abilities, such as shooting electricity and flame from your hands, to temporarily befriending a Big Daddy for your protection are closely knit with the environment and neatly paired with the traditional weapons. The graphics in BioShock are excellent — using the Unreal 3 engine, the boys at Irrational (now 2KBoston & 2KAustralia) have brought it to life with outstanding design and feel. Water effects are especially good, as expected in an undersea adventure. Playing with a DirectX10 card is recommended, so finally a use for those Nvidia 8800s! BioShock is available on PC as well as Xbox 360, and we can't recommend it more.

Metal Slug Anthology

Peter Dockrill runs and guns. And runs. And guns.

.: CONTACT QVS
.: ONLINE www.qvsoftware.com.au
.: PRICE $99.95
.: PLATFORM Wii

✔ Old-school arcade action.

✖ Repetitive; pricey; for fans only.

.: VERDICT ★★☆☆☆

As far as franchises go, the perpetually sequelled Metal Slug series comes across a bit like the gaming equivalent of *Friday the 13th*. And, while not quite reaching the double figures of, say, Final Fantasy, Metal Slug Anthology's collection of a respectable seven games would (at first glance) seem to offer good value for money. But on closer inspection, for us at least, things don't quite stack up.

First up, each version of Metal Slug here merely serves up the same basic gameplay again and again, never tampering too much with (nor adding much to) the basic formula presented in the original game: put simply, run and gun from left to right, shoot baddies, grab power-ups and kick butt.

While the cartoony and heavily stylised graphics and sound still hold some charm, the control (which is offered in several different configuations, including tilt play) never feels particularly refined. Metal Slug, which first appeared in 1996 (and as such came in very much at the end of the 2D platform era), has always been as much about the presentation as the gameplay, but now the compromise feels like it's stretching the friendship.

Certainly, the game has been received well elsewhere. But we can't help but feel that, at this price, on a next-gen console, Metal Slug Anthology is pretty much one for fans only. If it were a budget title, we'd be inclined to think more kindly about it but, at $99.95, Anthology just doesn't cut it when compared with other premium, full-price titles (or with budget Virtual Console content).

Arguably, Metal Slug's format of short bouts of intense shooting action might be better-suited to handheld platforms (and it is available for $69.95 on the PSP), but at home, playing this doesn't really feel retro — just a bit old.

Dofus

Chris Thornett takes on manga-style fun.

Dofus is an odd name for a free-to-play MMORPG that wants to be taken seriously, but then it's a refreshingly odd, manga-inspired game that stands out in a field of tired high-fantasy-themed games.

Unlike most MMORPGs, the world isn't continuous: it's made up of bright backdrops but each screen is only connected by clickable exit points, and mostly you use point-and-click to open menus or to move your little avatar about the place.

Level progression is by the usual bashing of beasties and partying up with other players, but Dofus has taken a leaf out of Japanese RPGs and opted for a turn-based combat system. It's not long before you're fighting off demented sheep-like creatures called gobballs or aggressive tofu — yes, odd. The predictable behaviour of the monsters inevitably limits the tactical side of combat, while the action is a little on the ploddy side, but it's far from simple and the death penalty is enough to make you weigh up your chances before diving into battle.

The game is riddled with wordplay humour, but the English localisation of the NPC chat is a little ropey. It makes the whole experience comparable to watching a beautifully cinematic film that's been poorly dubbed. And while the game mechanics are simple to pick up thanks to a new beginner's area, it's still often difficult to know how the overall game works. Often you'll have to ask for help or search the forums to figure out how to do things, instead of being taught in-game. In fact, it's very easy to find that you need to re-roll, simply by increasing the wrong stats for your class, as it's not clear which are important.

Overall though, Dofus is a swathe of manga-inspired colour amongst dreary free-to-play MMORPGs. It's certainly worth trying out, especially if you fancy being beaten up by a gang of vicious daffodils.

The monsters are oddball, but the gameplay is confusing.

.: CONTACT Ankama Studios
.: ONLINE www.dofus.com
.: PRICE Free ($8.30 per month sub)

✔ Different; colourful.

✖ Unwieldy; lost in translation.

.: VERDICT ★★★☆☆

Lost Planet

This 'Halo-killer' gets a frosty reception from *Richard Cobbett*.

Lost Planet was intended to be the Japanese answer to Halo. And it's set... in snow. Lots of snow. Lots and lots and lots of snow. Now, we've nothing against snow at *APC*: we like a good sledging trip as much as any computer magazine. But you can really get tired of it.

And that's the key problem with Lost Planet: while it is a decent, fun shooter, it quickly turns into a slog. And a tired, repetitive and not wildly compelling one at that.

A big part is the storyline, which has a needlessly convoluted amount of wibble, featuring typically bad lines and acting. Another is the shooting action, which doesn't offer a vast amount of freedom. On foot, you're a weakling, reliant on gobbling up floating energy pick-ups to avoid freezing to death (in a giant robot). While you get the fun of piloting a giant robot (and we approve of that on many, many levels) the weak controls take away much of the fun.

In both cases, it's obvious that the game has been built around the Xbox 360 controller rather than traditional FPS controls. With mouse and keyboard, you can blaze through the levels with little difficulty, except when you are fighting to land a good hit with your clumsy grappling hook. Without, it's frustrating to be left skittling around the screen trying to land a hit on one of the baddies' big flashing weak spots. The levels are a straight run to the end, complete with impressively large bosses to play 'spot the attack pattern' with, and they just don't particularly inspire either fear or white-knuckle excitement.

In short, Lost Planet is a decent-enough game, but one it's tough to work up any particular enthusiasm for. It can be fun, but you can do better — even by jumping back a couple of years with Halo 2. (Or waiting for winter and the hope of a snowball fight.)

Pilot your giant robot — but make sure not to catch a chill.

.: CONTACT Capcom
.: ONLINE www.lostplanetthegame.com
.: PRICE $89.95

✔ Giant robots; fun at times.

✖ Feels like hard work.

.: VERDICT ★★★☆☆

Tomb Raider: Anniversary

APC 1337

Richard Cobbett digs up the past.

Anniversary is a remake of the first Tomb Raider. If you never played it back in the day, that bit doesn't matter. If you did, the difference between this free-roaming version and the original square-by-square navigation is night and day, and makes it feel like a whole, fresh experience again. It's a reminder of just where the series went wrong for so many years — a return to the time when it was impossible jumps and towering cliffs that got in the way, rather than ancient conspiracies and armies of gun-toting baddies. Even Legend, itself a welcome return to form, tended to over-simplify the platform bits and puzzles to the point where all you really had to do was scan each room and connect the metaphorical dots.

By contrast, Anniversary is quite happy to have you tear your hair out over frustrating jumps and seemingly random collections of platforms. It's actually more fun than it sounds... at least, it is when you crack it, instead of Lara's spine.

If you remember the original game, you'll find that most of the differences this time around are good ones. Scenes that were only cut-scenes first time around are now interactive, even if some of the ones that were interactive before now bizarrely use tedious arcade sequences that ask you to tap a button or die instantly— these increasingly seem to be the rage. They've given developers the chance to be action directors, but at the cost that it's no longer you performing the cool tricks that save the world and defeat the big boys.

For the most part though, this is a worthy successor... well... repeater of the name. As with Legend, it's proof the series didn't die during its last few unwanted sequels. Hopefully the next one will manage a fresh adventure.

.: CONTACT EIDOS
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✔ A return to form for the series.

✖ Some tweaks unsuccessful.

.: VERDICT ★★★★☆

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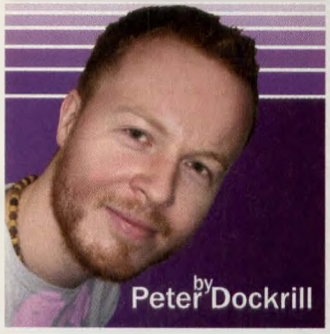


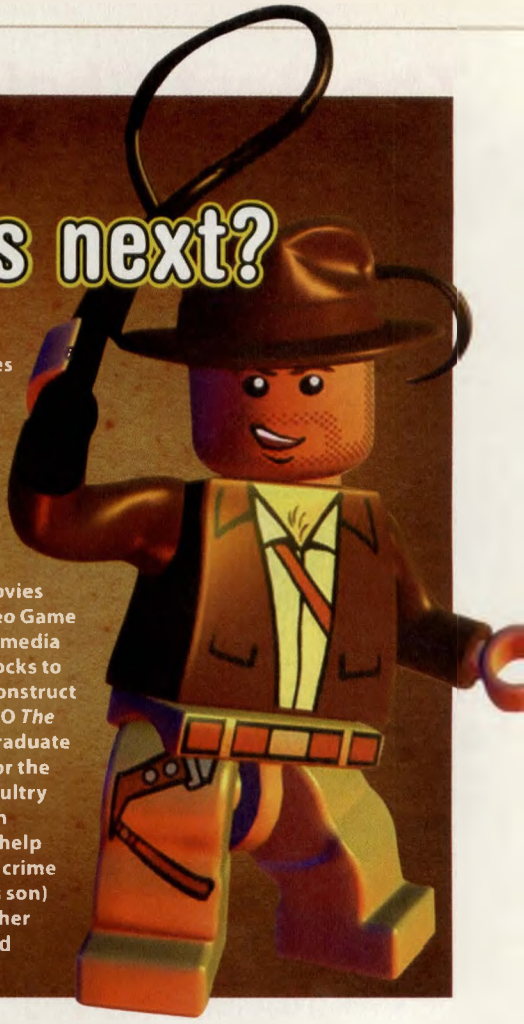
by Peter Dockrill

BORN TO RUN

Whippersnappers: they always seem to have the latest, coolest and best of everything, yeah? Well, in a tale to warm the hearts of even the most cantankerous coots, we can report that the world's fastest personal internet connection is in fact owned by a 75-year-old lady. Yes, old timers, you read that right! As covered on Swedish news site *www.thelocal.se*, Sigbritt Löthberg's home kit is equipped with a rather zippy 40Gbit/s net connection, which enables her to download a HD DVD in about two seconds (give or take a cup of tea). The speedy setup is thanks to her son, "Swedish internet legend" Peter Löthberg, who works for Cisco (which contributed to the project) and who wanted to demonstrate the technical possibilities of fibre. Now, 40Gbit/s eh? That's a heck of a lot of *Rumpole of the Bailey*...

She may have the world's fastest internet connection, but does she know how to turn the darn thing on?

LEGO® games: what's next?



It was with eager anticipation that we heard LucasArts' recent announcement that the company would be following up its huge-selling LEGO *Star Wars* game series with none other than LEGO *Indiana Jones*: The Video Game. Finally, a chance to don the battered hat and crack the trusty whip of one of celluloid's favourite sons, only — this time — with integrated building block gameplay. I mean, where else can you use coloured bricks to dodge boulders, stick it to the Nazis *and* prove that archaeology is the search for *fact* (not truth) all at the same time? But seriously, we're excited, and we couldn't help but wonder what other famous movies wouldn't be improved by an association with LEGO Video Game status. First up, how about LEGO *Citizen Kane* — play as media magnate Charles Foster Kane and use LEGO building blocks to fortify his crumbling life and business empire — plus, construct 'Rosebud' to help you out of tricky spots! Or maybe LEGO *The Graduate* is more up your alley — as awkward college graduate Benjamin Braddock, use LEGO bricks to fend off — or, for the more emboldened player, *ensnare* — the attentions of sultry cougar Mrs Robinson. Or, why not keep it in the family in LEGO *The Godfather Part II*? First, utilise LEGO pieces to help young orphaned immigrant Vito Corleone assemble his crime syndicate in New York, and then, as new Don (and Vito's son) Michael, use LEGO blocks to assassinate traitorous brother Freddy and effectively build a wall between yourself and the man you intended to become!

Waiter, there's a fly in my soup!

We've all heard the horror stories: while dining out, friends find a suspicious, curly hair in their laksa... or maybe the one about the guy down the pub who discovered a dead rat baked inside a loaf of bread? It happens – breaches in food safety laws pose a serious health risk to society, and the NSW Food Authority has taken affirmative action with its online publication of a 'name and shame' convictions list at *www.foodauthority.nsw.gov.au*. The 'shame register' will ostensibly provide all those nasty, little details about what really goes on out the back at your shonky local, in an attempt to provide consumers with "easier access to information about the Authority's successful food convictions [so they can] make better choices with greater peace of mind." As Primary Industries Minister Ian Macdonald said: "The web site shame register is an important step in helping stamp out dodgy food practices and protecting consumers in NSW." At time of writing, there's only one conviction on the list – a "Scotch Whisky" supplier whose product did not contain the requisite 40% alcohol content required for the drink to be described as such. However, we look forward to seeing the list expand and finding out about all the places we'll never go to again! APC

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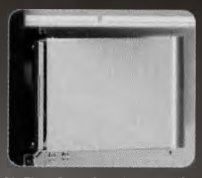

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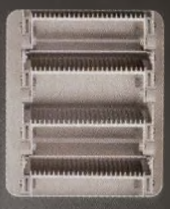

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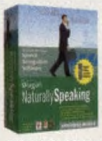

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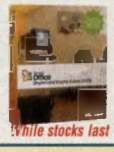

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Direct in Dials:	0	0	1	2
Extensions:	1	2	2	5
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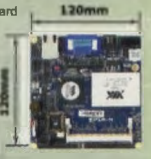
- LVDS/DVI (optional)
- **Nano-ITX (120mm x 120mm)**
- Digital Media and Mobile Entertainment



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- 6 USB 2.0 ports
- 2 COM ports
- GLAN Controller
- TV Out (HDTV)
- LVDS/DVI (optional)
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- Digital Media, Entertainment, Set Top Box

Model: EPIA - EN

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- 1 COM port
- 10/100M LAN
- TV Out
- **Mini-ITX (170mm x 170mm)**
- KIOSK, Thin Client

Model: EPIA - CN

- All in One
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- DDR 266
- CardBus/CompactFlash Support
- 1 PCI slot, 1 Floppy Connector
- Vinyl 6 channel Audio
- IEEE 1394 Firewire
- 4 USB 2.0 ports
- 2 COM ports
- VIA 10/100 LAN
- TV Out
- LVDS/DVI (optional)
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- DDR 266
- 1 PCI slot, 1 Floppy Connector
- Vinyl 6 channel Audio
- IEEE 1394 Firewire
- 4 USB 2.0 ports
- VIA 10/100 LAN
- TV Out
- LVDS/DVI (optional)
- **Mini-ITX (170mm x 170mm)**
- Digital Media and Entertainment

Model: EPIA - M

19" Mini-ITX Rackmount

Model No.:7677

- 19" 1U Rackmount
- Internal 3.5HDD x 1
- PCI Expansion Slot x 2
- Slim Type CD / DVD x 1
- 45(H) x 484(W) x 400(D)
- Cooling: 2 x 40mm fans
- Power and HDD indicators
- **Mini-ITX(170mm x 170mm)**
- Power on/off

Firewall/VPN/Telephony/Telecom/VoIP Network/Security/Military Application

Model No.: C1B

- 19" 1U Rackmount
- Internal 3.5" HDD x 1
- Internal 2.5" HDD x 1
- PCI Expansion Slot x 1
- Slim CD-rom/DVD-rom x 1
- **19"(W) x 13"(D) x 1.75"(H)**
- **Mini-ITX(170mm x 170mm)**
- Cooling: 2 x 40x28mm fans
- Power on/off and system reset
- Power, LAN and HDD indicators

Firewall/VPN/Telephony/Telecom/VoIP Network/Security/Military Application

Model No.: C1E

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- Internal 2.5 HDD x 1
- Slim Type CD / DVD x 1
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- **Nano-ITX (120mm x 120mm)**
- Power on/off and system reset
- **82.5mm(H) x 160mm(W) x 163mm(D)**

Home Media Center, Set Top Box, Kiosk, Wireless Media

Model No.: 2677

- Color: Black
- Expansion Slot x 1
- Internal 3.5" HDD x 1
- 4cm Cooling Fan x 2
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Mini ITX (170mm x170mm)**
- Power on/off and system reset
- **63.5mm(H) x 295mm(W) x 272mm(D)**

Home Media Center, Set Top Box, Kiosk, Wireless Media

Model No.: 2600

- Color: Black
- Expansion Slot x 1
- Internal 3.5" HDD x 1
- 4cm Cooling Fan x 2
- Slim Type CD / DVD x 1
- **63.5(H) x 295(W) x 272(D)**
- **Mini ITX (170mm x170mm)**
- 60W/80W Power Adaptor
- Power on/off and System Reset
- USB x 2, Audio x 1, Mic x 1, 1394 x 1, IR Module (Optional)

Set Top Box, Thin Client, Car Entertainment, Smart Mini PC

Model No.: 3677

- Front Port: USB x 2
- Internal 2.5" HDD x 1
- 6cm Cooling Fan x 1
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Mini ITX (170mm x170mm)**
- Power on/off and system reset
- **65mm(H) x 210mm(W) x 275mm(D)**

Set Top Box, Thin Client, Car Entertainment, Smart Mini PC

Model No.: 3688

- Front Port: USB x 2
- Internal 2.5" HDD x 1
- 6cm Cooling Fan x 1
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Mini ITX (170mm x170mm)**
- Power on/off and system reset
- **65mm(H) x 210mm(W) x 258mm(D)**

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From: *$975

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Integrated 10/100/1000
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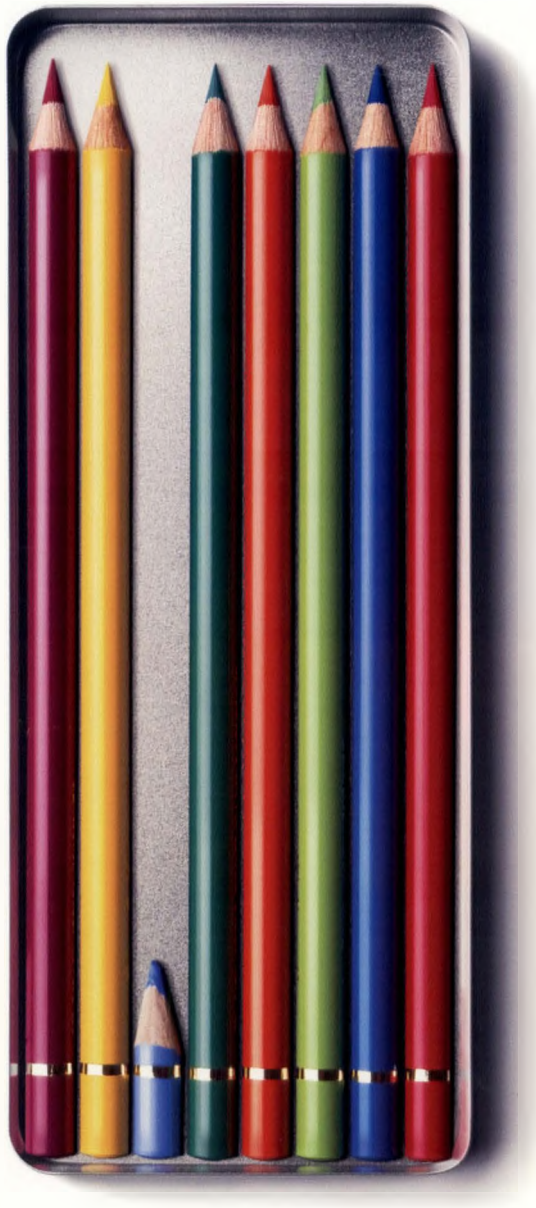

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